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Canada's Personal Computing Magazine

July 1985

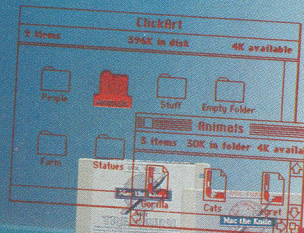
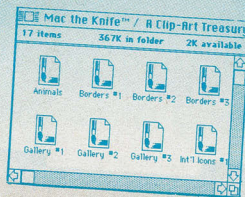
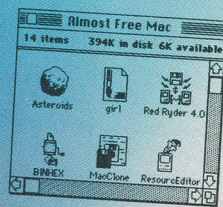
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## Macintosh Issue

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• AutoCAD and Blort!  
for the PC

• Adventures of the  
BBS Numbers



• Apple CP/M  
PROM Night

• Computer for  
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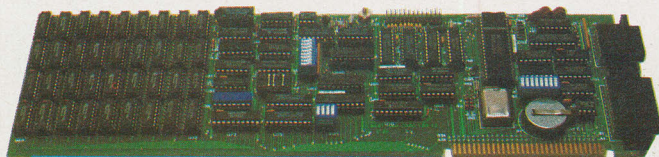
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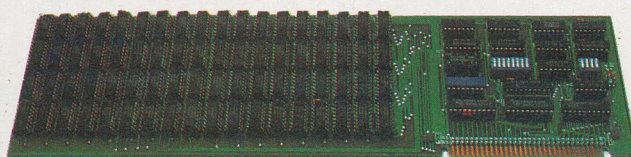
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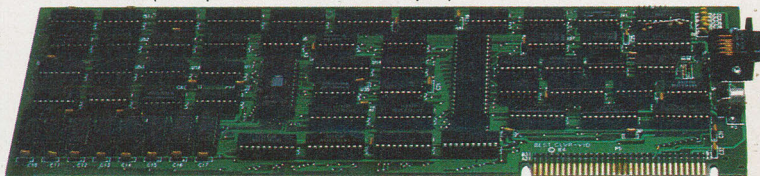
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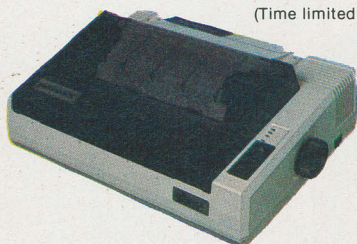
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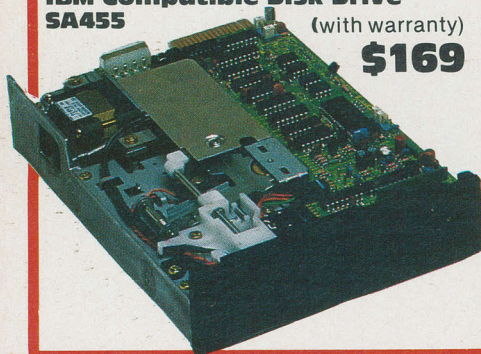
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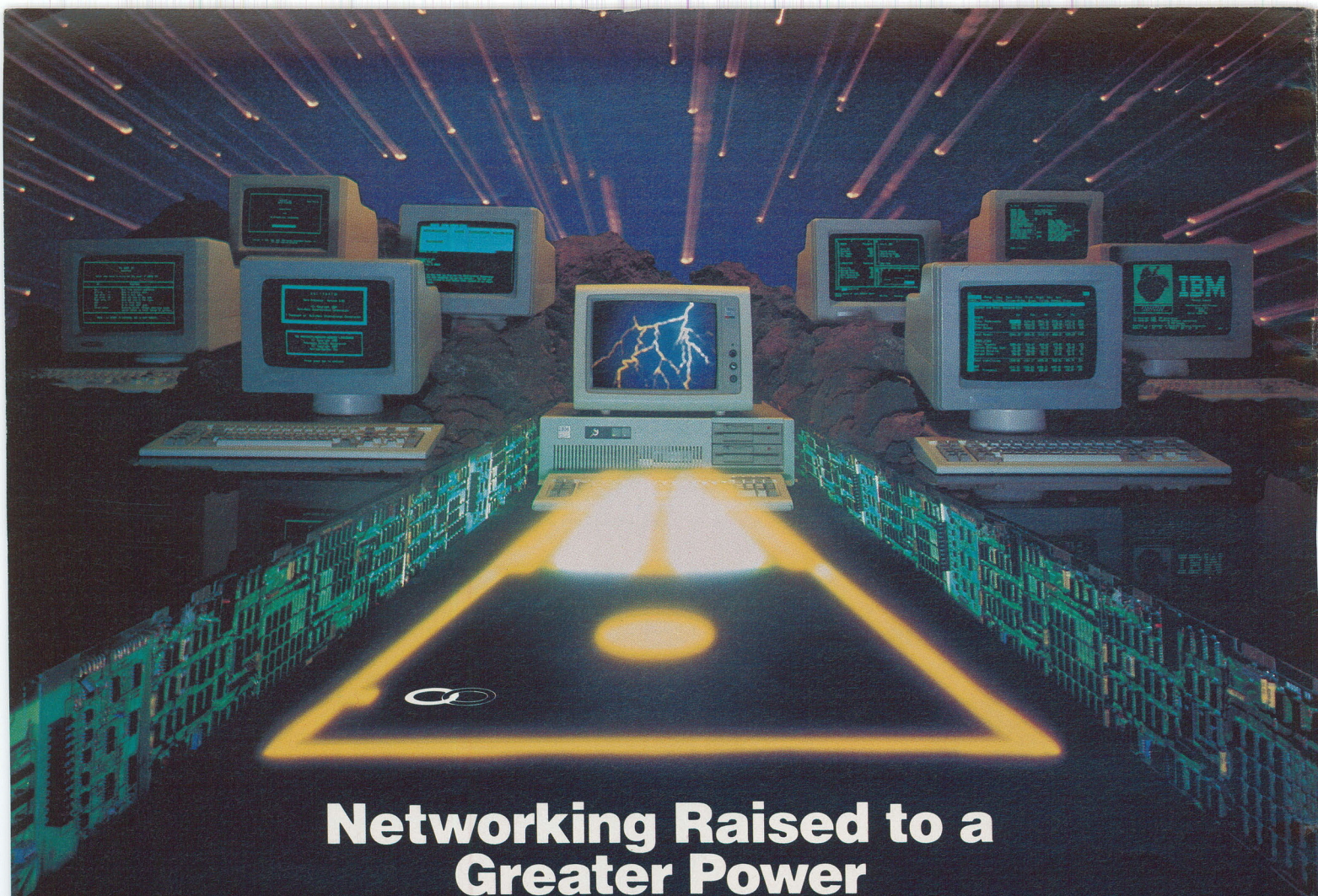
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# Computing! Now!

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### Plot It

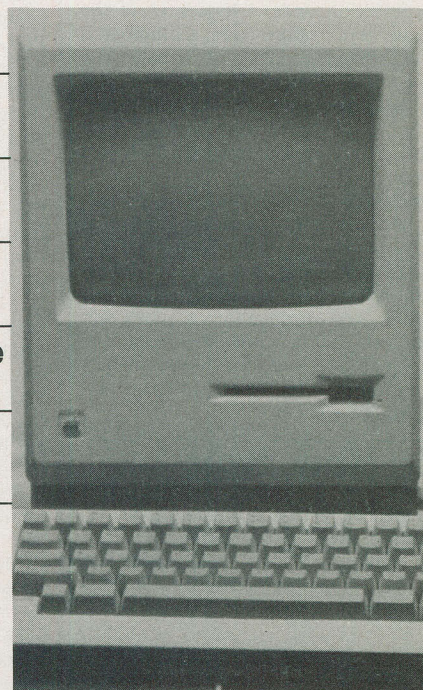
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# COMPUTER PRESS

by John Rudzinski

## Computer News

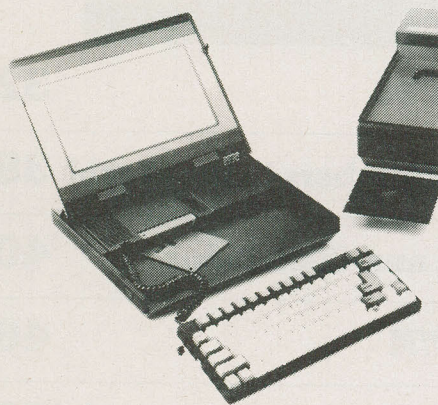
**COMPUTING NOW!** — As the months get warmer, the microcomputer industry seems to become more active, as does the rumour mill. Here's a quick summation of some goings on.

The bad news is that *Columbia Data Systems Incorporated* — manufacturers of the Columbia series of IBM PC compatibles — has filed for protection under Chapter 11 of the United States Bankruptcy code. Columbia is allegedly experiencing difficulty in collecting monies owed them. The good news is that both *Franklin Computers* and the *Osborne Computer Corporation* have reorganised, with Osborne producing product and Franklin well on their way.

*Apple Computer Incorporated* has discontinued the Macintosh XL, previously known as the Lisa 2/10. The business market that the machine had been geared to wasn't as interested as Apple had hoped it would be, though sales picked up when the computer was discounted. Speculation is still extant regarding a possible Apple takeover. The Cupertino-based company has been laying off staff and taking cost-cutting measures.

## More New Blue

**COMPUTING NOW!** — While numerous industry analysts are walking about in a daze mumbling about shakeups, shakedowns and shakeouts, new computer models are still being announced. Here's a look at the newer offerings.

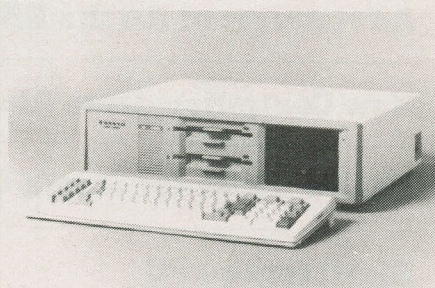


- The *Kaypro 2000* from Kaypro Corporation is an 11 pound, lap sized portable computer. It features IBM compatibility, 256K of RAM (expandable to 768K), a serial port, an 80 character by 25 line LCD screen, an internal 3 1/2" disk drive with 720K of disk storage, a detachable keyboard and a battery pack and charger. Software including MS-DOS, GW-BASIC, WordStar, MailMerge, InfoStar+ and CalcStar is bundled with the computer. Options include a second 3 1/2" drive and an expansion chassis which, when affixed to the computer's base, provides two expansion slots, a serial and parallel port and allows the addition of 5 1/4" floppies and/or a hard drive.

The Kaypro 2000 retails for \$3495.00 Canadian, and is available from *Computron*, 17507-107 Avenue, Edmonton, Alberta T5S 1E5 (403) 489-8400 or 55 Torbay Road, Unit #2, Markham, Ontario L3R 1G7 (416) 477-0828.

- *Zenith Data Systems Corporation* of Glenview, Illinois, has announced five new personal computers. The *Z-200 Advanced PC* is an IBM PC/AT compatible with 512K of RAM and six AT-compatible peripheral slots. The Z-200 is available in two versions, one with a single floppy disk (retailing for \$3999.00 U.S.), the other with a 20 megabyte hard drive (retailing for \$5599.00 U.S.). Zenith's new *Z-171 Portable PC* weighs 14 1/2 pounds and offers IBM PC compatibility and 256K of RAM. It features an 80 character by 25 line flat panel backlit LCD screen. Suggested American retail price for the dual floppy disk drive portable PC is \$2699.00. Weighing 24 pounds, with a built-in seven inch amber screen and a detachable keyboard, the single drive 128K version of the transportable *Z-138 PC* retails for \$2099.00 U.S. The dual drive 256K version of the Z-138 has a suggested American retail of \$2399.00. Zenith's entry level *Z-148 PC* is IBM PC compatible, and retails for \$1899.00 U.S. in its single drive version, and the American retail for the dual drive version is \$2199.00. The *Z-158 PC*, an enhanced version of Zenith's Z-150 PC, includes a 'turbo' switch to boost operating speed up to 60 per cent. The Z-158 is available in three configurations: 128K single drive, 256K dual drive and 10 megabyte hard drive. Suggested American retail prices are \$2499.00, \$2899.00 and \$4099.00 respectively.

Zenith computers are distributed in Canada by *Heathkit-Zenith*, 1020 Islington Avenue, Toronto, Ontario M8Z 5X5 (416) 231-4171.



- *Sanyo Business Systems* has announced the *MBC 880* desktop computer. The IBM compatible computer features dual clock speed, has eight expansion slots and a video card, and is bundled with MS-DOS 2.11, GW-BASIC, WordStar, CalcStar, InfoStar, MailMerge and SpellStar. The one drive system, which can accommodate two 5 1/4" floppies and a hard drive, has a suggested Canadian retail price of \$2495.00.

The head office of Sanyo Business Systems, a division of *Sanyo Canada Incorporated*, is located at 50 Beth Neilson Drive, Toronto, Ontario M4H 1M6 (416) 421-8344.

## Next Month In

# Computing Now!

### Let There Be Music!

In the next edition of *Computing Now!* we'll be checking out computer music. Among the things we'll be looking at will be an overview of the new MIDI based music hardware and software... a lot has happened since our last peer... some of the techniques used in creating computer music and some music programs. We can't get the publisher to pose for the cover again, but otherwise there'll be plenty to check out in the next CN!

### Dialog Boxes on the PC!

One of the things which makes the Macintosh's operating system really slick is its use of dialog boxes. In the next edition of *Computing Now!* we'll be looking at assembly level code to handle these powerful programming tools on the IBM PC. They'll make your applications look extremely slick and, if you handle them right, they don't have to take up a lot of programming overhead.

### LANs

Local Area Networks are one of those things that users of business computers just love to talk about... sadly, they're all talking about different LANs with different capabilities and, most important, different and incompatible protocols. In the next edition of *Computing Now!* we'll be looking at the various popular LAN configurations available and the power of each.

### Scapple Card

If you have an Apple and lack of powerful serial card you won't want to even contemplate missing the next edition of *Computing Now!* We'll be looking at the construction of a serial interface which is supported by a number of popular software packages. It has all sorts of features and it's amazingly inexpensive.

**These features are in an advanced state of preparation and if the gods smile on us you'll see them. The gods are a bit fickle at times, however, and we do reserve the right to change the final contents of the issue prior to our going to press.**

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### AT PARTNER

The Partner is expandable up to 1.5 mb on its main board, and can be expanded further through the use of the Memory Expansion Module. The AT Partner can be used with the basic or enhanced IBM AT. The Partner board also includes one

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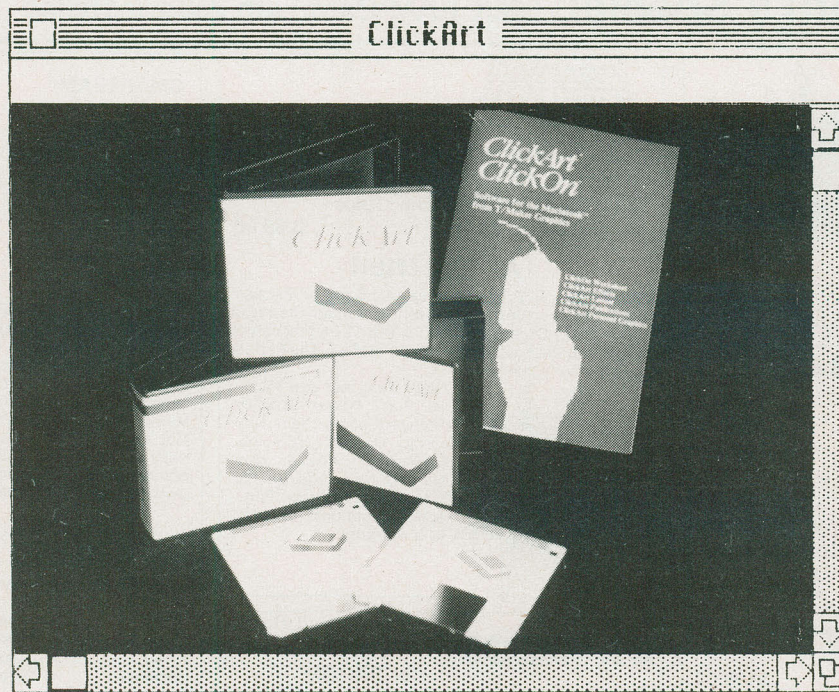
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# ClickArt



**These four diverse packages will enhance the power of MacPaint, add fonts to your finder and give you some really wild bits to Mac away on.**

**by Steve Rimmer**

A few months ago I got into some heavy research to find the Macintosh software that would eventually go into this issue. This turned up a lot of stuff... including what seemed like a few thousand data base managers. Quite a bit of it, despite fancy advertising and really slick packaging, turned out to be heavily dull when it hit the drives.

Far removed from all those data bases, however, ClickArt, from T/Maker Graphics, was the most fun. It makes MacPaint do handstands. It's one of those many things that no one with a Mac and an imagination will want to be without.

In fact, ClickArt consists of four unique packages, of which you may find that some or all suit your needs. The capabilities of all this stuff is amazing. Included in it are new fonts, graphics and a software patch for MacPaint that allows it to do some interesting image manipulations.

## **T and Crumpets**

The first bit of ClickArt I checked out was the effects box... this looked to be the most useful of the lot. When installed in MacPaint it adds four new effects to the already rich graphics facilities of this powerful application. Specifically, it allows you to take a portion of a MacPaint document... you do, of course, get to pick which portion is involved... and warp it.

With the effects installed you can rotate an image as much or as little as you want to... down to a single degree if you feel like it. MacPaint alone only allows for rotations in increments of ninety degrees. You can also tilt an image to give it a sense of perspective and flex it in a number of ways. There are four individual distortions available with the thing.

The power of these effects is astounding. Stuff that used to take hours to do laboriously by hand can be handled in mere

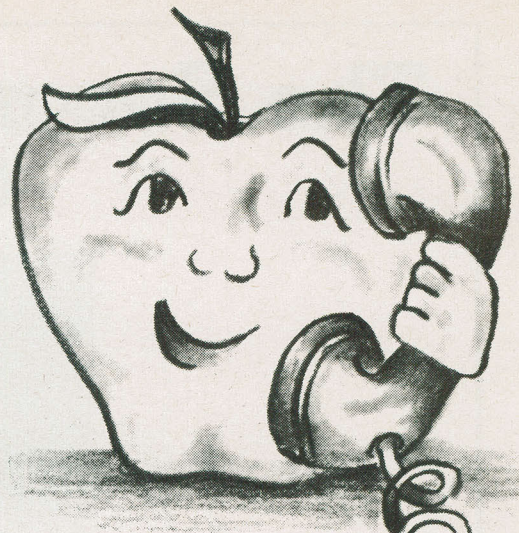
seconds with them. Whereas one commonly attempts to design MacPaint pictures which lie comfortably in horizontal or vertical planes, this package makes it dead easy to create things in mundane dimensions and then simply twist them.

One of the really easy graphic effects that can be handled with this capability is in giving objects shadows. One would create an image... such as the *electric musick* sign in this feature... and copy it into the clipboard. Fill in the image so that it's solid black... or a solid tone... and get into the ClickArt effects menu. Using the parallelogram icon bend the sides of the shadow in. Return to MacPaint and paste the clipboard back into the picture. Not only does it all fit, it even lines up without any fidgeting.

There are a few limitations to using these effects, although they are ones which any sane sentient being will probably live



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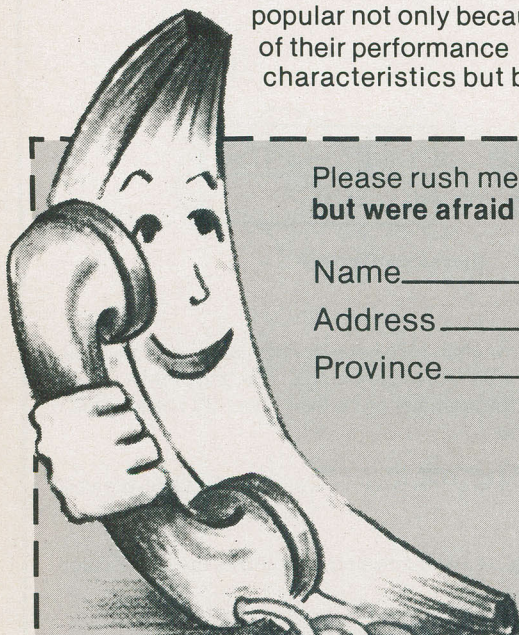


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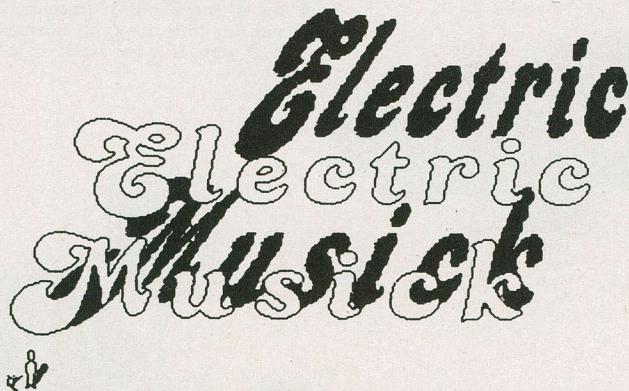
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## Computing Now! July 1985



# ClickArt



An example of the ClickArt effects and the Rio display fonts.

with. For example, while you can rotate things as much as you like, the software must do a fair bit of smoothing and general guessing to make a rotated image look reasonable. This works better at some angles than others. If you insist on using an uncomfortable rotation angle you may have to touch up a few pixels with fat bits.

Some angles, such as forty-five degrees, produce perfect rotations in almost all situations.

This is, clearly, something Apple should have included in MacPaint. However, seeing as how they didn't this little accessory cures a multitude of sins.

Now... for something to twist with.

## Clipper Ships

There are two ClickArt packages which contain images. The primary one is a collection of MacPaint files which holds lots of pictures. This is, in fact, where the name of the whole affair is derived from. "Clip art" is a publishing term for stock illustrations for use in magazines and newspapers.

The pictures and graphics in the images files are phenomenal. There are a lot of relatively useless American presidents... well, no, I did have rather a lot of fun with Ronald Reagan and a corkscrew I found in another file. There are other humans as well, such as Mark Twain and Boy George. There are also pots of little bits... pictures of flotsam such as a push pin, several cats, some cars, borders, a few cartoons, the inevitable space shuttle, assorted statuary and a few landscapes.

Like all MacPaint images, these things can be manipulated any way you feel like. You can extract bits of them to use as headings or illustrations in MacWrite documents, combine sections of them to be generally weird or just paste them around in

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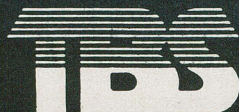
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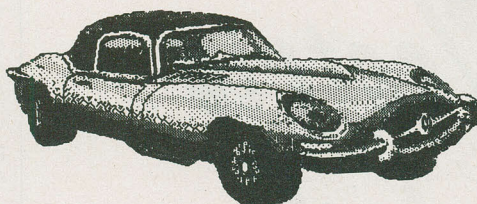
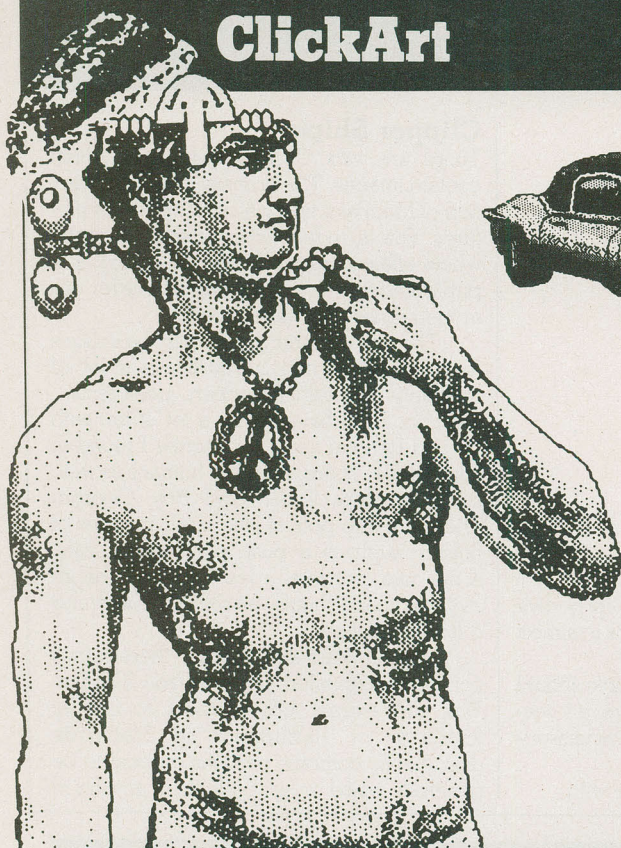
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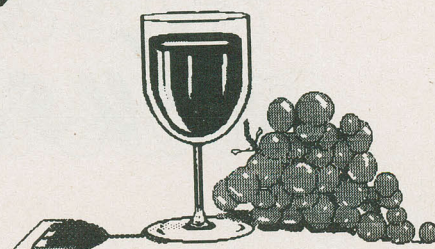
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# ClickArt



A few of the ClickArt images. The file of David, far left, does not normally look like this. It can if you want to play with it, however.



other files. Consider the top half of Michelangelo's David, seen here Decorum sadly prohibits me from printing the bottom half.

A complete David is available. Send us a self addressed and stamped envelope. The bottom is a lot ruder than the top.

The ClickArt images are dangerously amusing. They're extremely well executed and well worth what they cost.

A similar file... if rather more specialized... is ClickArt publications. These images tend to have something to do with publishing. There are a few sample page designs and tons of the little images one uses in print... flying fingers, fancy borders, cartoons, banners and headlines. This one seems to be designed for people who publish newsletters and similar bits on the Mac. However, even if you just stick up Mac'd posters or notices they're worth the spring.

Finally, there is a set of fonts for the system. The allocation of fonts which comes with the Macintosh is a bit pedestrian... at least, it gets that way after a while. To this end, the ClickArt font package provides a number of new fonts, all named after cities you've probably gotten post cards from at least once in your life. You'll notice that no one has ever done a font for Pickle Lake or Kapuskasing.

In fact, the font package contains two sorts of fonts. The most useful of these are

genuine font files that one works into one's finder for use with MacWrite or MacPaint... or, in fact, any Mac application that allows one to choose the font one's text will appear in. You'd need the font mover from the system disk to take care of this.

These fonts are pretty decent. They all work well and look suitably polished. In fact, it isn't all that easy to design a font that looks

reasonable in actual type. These guys have been nicely executed.

Rather more than half of the fonts disk, however, is taken up with MacPaint files. These guys hold not fonts *per se*, but letters. They're used for doing large banner headlines that can't practically be typed. As the Mac doesn't directly allow for characters bigger than thirty-six points in height, these things are handled as individual images that can be cut and pasted around a document.

It's a bit like setting cold type by hand... although you don't have to read it backwards. While a lot easier than drawing letters by mouse and much more attractive than simply expanding a font in MacPaint, these guys take a lot of meddling to get 'em right.

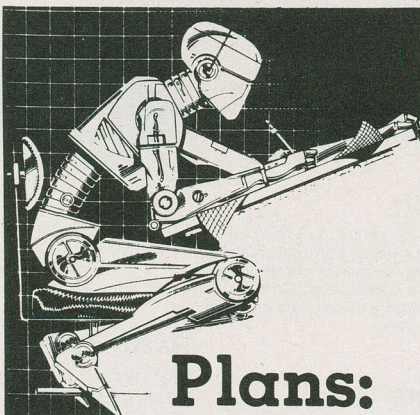
The *electric musick* sign began with the seventy-two point Rio font from this collection.

## At The Sound of the Click

It's always impressive to see software which is this good... and this innovative... that doesn't cost too much. ClickArt is unquestionably worth what it goes for. It's a serious gas to play with and, if you're into anything even slightly graphic on the Macintosh, it has some actual practical applications.

You can spend a week just being cruel to the pictures. You're dying to see what we did to the other half of David, aren't you...

CNI



## Plans:

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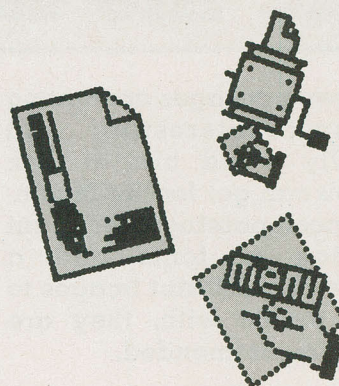
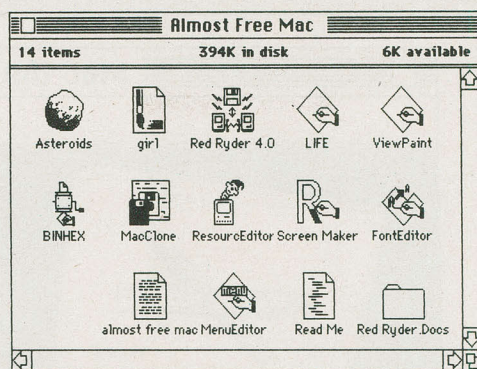
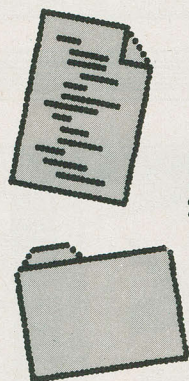
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We've had public domain software for the Apple, for CP/M based systems and gallons of it for the IBM PC. After some digging we turned up some equally super stuff for the Macintosh. Some of these programs will blow your socks and some toenails clear off.

This collection consists of almost four hundred K of applications and documentation files. There is something in here for even the most jaded Macintosh user. Feed your mouse now . . . it'll need the energy.

**Asteroids** This is an implementation of the classic arcade game which is considerably better than most of the ones you lost your life savings in quarters to. The graphics are too splendid to be adequately described with mere words.

**Girl** Those of us who are quick enough explain this sort of thing as art. The rest call it lechery. However, it's a really well done MacPaint image in any case.

**Red Ryder** Telecommunications on the Mac has never been this easy. Red Ryder includes the XMODEM and Kermit protocols and lots of other features.

**BINHEX** A second banana of Red Ryder, this program converts applications files to binary files and back again to allow them to be transferred over phone lines.

**Life** Life is one of the classic computer programs, and this implementation is exceedingly well done. It simulates micro organisms living and dying . . . and eating each other. Alternately, it might be a parking lot full of Toyotas.

**ViewPaint** Ever want to check out a MacPaint file in a hurry without getting into MacPaint? This little utility lets you peer at the top bit of a picture with a minimum of overhead and waiting.

**MacClone** The disk copy routine in the Mac's system disk is a bit barbaric. This is a vast improvement. It even does in some copy protection schemes.

**ResourceEditor** The icons and other resource items of the Mac just cry out for meddling with. This little tool does it for you.

**ScreenMaker** Moving text from MacWrite to MacPaint can be a bit disappointing . . . something gets lost in the clip board. This utility lets your words make the trip unscathed.

**Font Editor** For those longing to make their own fonts . . . and for those who just want to adjust the ones they have . . . this application lets you fat bit to your heart's content.

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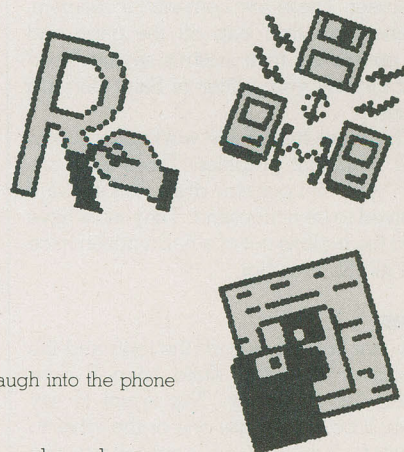
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We are not charging you for the software, but rather, for our time in collecting, sorting and assembling it, plus the cost of the disk and postage and handling.

We've tested this software pretty thoroughly, and it all seems to work properly. Some of it is capable of hanging the system if it is used incorrectly. Some, like the Resource Editor, will require a degree of knowledge of the insides of the Mac to fully apply it. There isn't much documentation in this area . . . be prepared to have to experiment a bit. We are unable to assist you in applying this software to your specific needs.

This software is supplied without a finder or other system files on the disk. You will have to copy it onto a disk with a system to use it.



# Mac the Knife

These two packages are among the most interesting and generally weird bits of disk dust you can get for the Macintosh. Encompassing a brilliant collection of fonts and a treasury of MacPaint images to deface things with, they are heartily recommended.

by Steve Rimmer

**M**ac the Knife, by Miles Computing, is a lot like ClickArt... but I'd have a very hard time deciding between the two if I could only have one. It would be a lot like deciding between a '75 Chevy pickup with mud tires and a '71 Oldsmobile with an altimeter... both equally fine vehicles, neither with catalytic converters, but each profound in its own way.

I have both the pickup and the Oldsmobile. Likewise, I make about equal use of ClickArt and Mac the Knife. Both are a blast.

If you get both volumes of Mac the Knife you'll have two different things to add to your Macintosh. The first, and arguably the most practical, is the nicest set of fonts you can get for the system under one roof. Unlike as in the case of most of the commercial font collections available, these things have not been designed to be conservative or discreet. These are authentic screamers, headline fonts that leap off the page and grab people by their nostrils saying "read me or I'll mail you a litter of Saint Bernard puppies."

The other half of the works is a collection of MacPaint graphics. These guys are good... you or I couldn't draw half this stuff if we lived to be a thousand. They must have ripped the buttons out of a half a dozen mice to get all this together.

## Cities

I think that in fairness both the fonts and the graphics of Mac the Knife have it over ClickArt for originality. This is not to say that you'll be able to use one or the other to a greater degree. Your applications and headspace will determine which you want. Inasmuch as they're both pretty cheap, it would be a shame not to have them both.

One of the things which people do wrong in selecting typefaces... what the Macintosh likes to call fonts... is in failing to differentiate between type for body copy

and type for headlines and titles. This is further compounded by the awful temptation to use lots of fonts in small spaces. You don't have to bother with font collections at all in this case... just use San Francisco.

Body copy type is, by its nature, fairly simple. It has to be... if you take a weird font and shrink it down to twelve point it gets very hard to read.

Display faces... the stuff for headlines... can be fairly strange if you want it to be. This is primarily where Mac the Knife is so wonderfully useful.

Most of the fonts that come with the Macintosh are primarily body copy typefaces and, while they can be used as display faces they don't look all that adventurous. The Mac the Knife fonts, on the other hand, are anything but austere.

I don't know how they arrive at cities to attach to many of these things. Things like Woodstock and Saigon... the latter is supposed to look like the stencilling on the side of an army packing crate... are simple enough. Carmel is supposed to be a bit psychedelic. Kawasaki looks like Japanese brush calligraphy and Washington looks like a typewriter. I'm not sure about the rest of them.

The fonts are extremely easy to use... you just copy the font mover from your system disk onto the disk whose finder you want to infest with these things. Everything's pretty well menu driven from there. There is one thing that is a bit tricky about the font

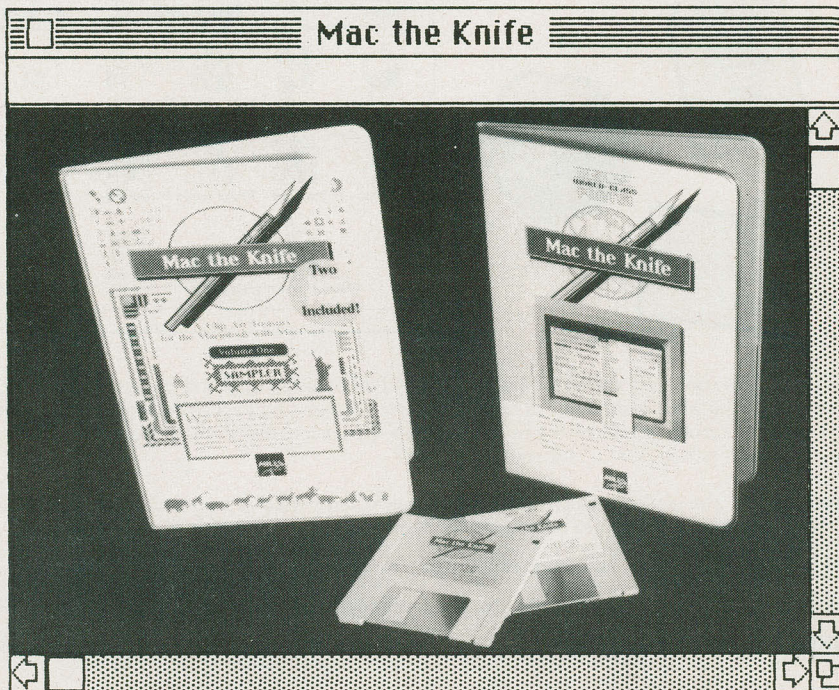
files... they're locked. If you copy one onto your disk, rather than using the font mover to copy the necessary fonts from it to your finder, you will find it reluctant to leave afterwards.

Mac Tools, from Copy II Mac by Central Point Software, snuffs off locked files... it's another one of those things that people with Macintoshes ought to have.

The most striking thing about the Mac the Knife fonts is that they are enormously fun to use. There are, for example, pots of peculiar characters buried in them that you can get at with the option key. Most of the fonts will display the flags of the countries where their cities are located, for example, by hitting option colon.

There are also fractions in there, characters with accents and lots of mathematical and scientific symbols. One also comes across quite a few special purpose things. Boise contains a potato character. Camelot has a lot of medieval looking stuff, like horses and swords. Cupertino has an Apple logo, a tiny little Macintosh and a pirate flag. This is very subtle indeed. Dallas has a six gun, Hollywood a movie camera and Mos Eisley has R2D2 and the Enterprise. Actually, there are quite a few more peculiar symbols in each of the fonts.

The font disk also comes with a host of grey patterns which can be used in MacPaint. These, too, are quite a good trip.





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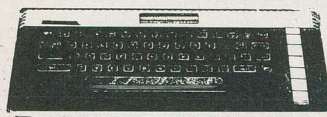
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# Mac the Knife

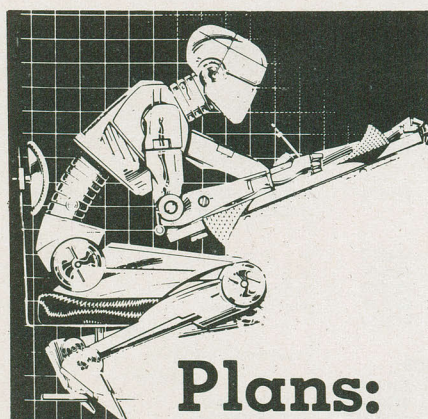
As with ClickArt, the fonts have been well designed to look right when they're used in text. There were no glitches in the kerning... the space between the letters... or the general character design consistency when one actually formed words, rather than demos, with them.

## Hot Images

The other half of the party is this collection of pictures. Somebody did some really good drugs when they thought up some of these things. There are, for example, silhouettes of all manner of beasts, the eye of Horus... that's the eyeball in the pyramid on an American dollar bill and most of Robert Anton Wilson's books... corporate logos for almost everyone that issues credit cards, road signs that do things like "no U turns" and "no preppies", maps of most of the world, a few game boards, a very nice looking ten speed bicycle and enough icons to design a whole other operating system.

There are a few inconsistencies in these. For example, the manual says there should be a road sign that says "no bozos". I really wanted that one but it wasn't there. Maybe the real Bozo got upset... it was easy enough to re-create, in any case.

Finally, there is a massive collection of patterns and textures associated with the files. They don't actually pertain to the drawings in most cases... they're just in there to sweeten the pot a bit. You can, of course, use them all by themselves.



## Plans:

Program:  
Manufacturer:

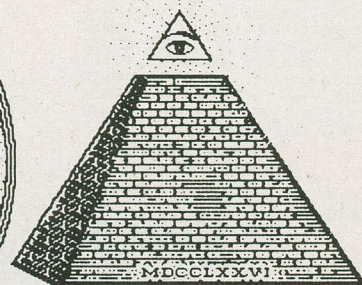
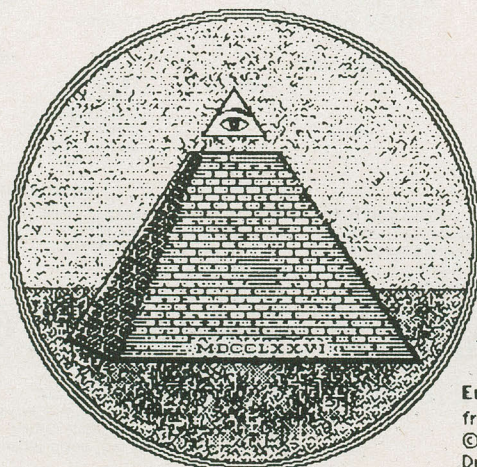
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the consensed bubble of Agent Orange  
echoed through the cave below  
the abandoned chemical waste dump  
IN ALL THE WORLD, THERE  
was no place so comfortable as  
this.

Some of the fonts from the Mac the Knife... and how not to use them.



## Engravings

from Mac the Knife™ Clip-Art Treasury  
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Drawn by Cliff Joyce

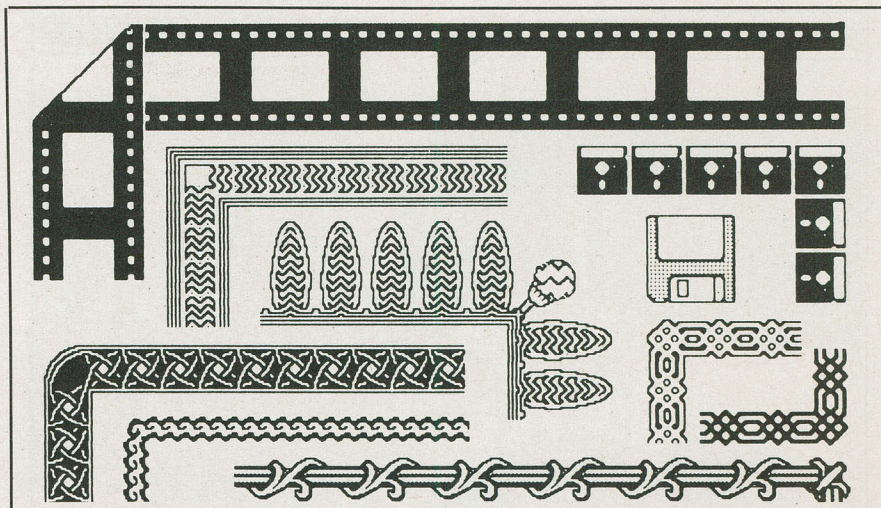


There are both serious and artistic uses for all of this. The border fragments can be assembled into really slick looking frames and edges for documents and suchlike. A lot of this stuff would look at home around coupons and warranties. The credit card logos are handy for advertising. The assorted maps will have business uses 'til the cows come home.

Obviously, the artistic applications of these things are limited only by your imagination. I was experimenting with making the world map into a BASIC picture file and laying a video game on it. This eventually combined with a maze and a picture of Steve Wozniak that turned up the Cupertino font.

You are a higher up at Apple Computers. Your task is to keep Wozniak from leaving Apple again. Your only tools are a sword, a lamp and an eleven million dollar rock concert. The clock is running... it got pretty wild after a while.

It's hard to even guess at all the things one can do with the plethora of images available in Mac the Knife's clip art treasury.



However, a lot of the general spirit of fun and self expression... maybe that's self indulgence.. that's inherent in Apple computers is wrapped up in these two packages. Someone has taken a lot of time to put a raft

of hidden details and surprises into them, and finding out what one has is certainly half the fun.

If I hadn't had them free to review I'd certainly buy 'em both. **CN!**



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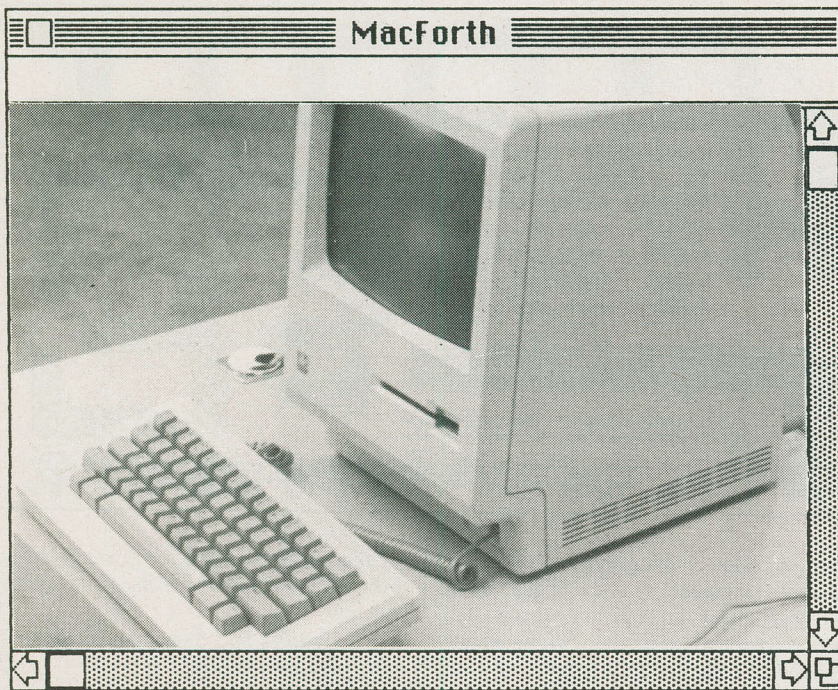
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# MacForth



**The problem of programming the Macintosh.... aside from writing random number generators in BASIC... remains to this day. One of the contenders for the vacuum is this implementation of Forth.**

**by Grant Corriveau**

**I**t seems too good to be true. There's a programming language for the Macintosh that has the interactive capabilities of BASIC, allowing the immediate testing of each program module as it is developed, but it executes faster and is more compact than BASIC could ever be. It has structured programming style like Pascal and also produces compiled code, but it encourages even greater modularity of design and is more efficient at passing parameters between modules.

It has machine level access and control like an assembler, but it allows for easier program development and is nicer to read, edit and maintain.

It also gives each programmer the power to adapt the system to his or her own needs or the needs of a specific program.

Judging by the title of this review you might have already gathered that this language is Forth. The implementation I use

is MacForth by Creative Solutions. It not only does everything I've mentioned, but it allows access to the things that make the Macintosh so unique and then adds a couple of twists of its own.

## Parameters

MacForth is available at three distinct levels. Level one is intended as an introduction to Forth. It starts with an interactive tutorial session which is really slick. One can read the text and examples in the instruction window, and may activate the system window at any time to try the features it describes. This is one way that the ability to execute programs in immediate mode makes Forth a treat.

The tutorial is a good introduction to basic Forth concepts, such as words as program modules, the use of a stack for passing parameters between these words, the use of post fix, or reverse polish notation in

mathematical expressions, and the use of flow control structures such as IF ELSE THEN, DO...LOOP and so on.

MacForth is a complete programming environment and, as such, it includes its own editor under which program text may be entered prior to loading. The editor uses the standard Macintosh text editing features such as clicking and dragging, cutting and pasting, and so on.

The editor is just one of the files included on the disk in source text. There is a Forth utility file which includes a terminal program and tools for editing program blocks and dumping the contents of memory. There are also several demonstration programs which show how to achieve some animation effects and use the speaker port to produce music.

The configuration of the system is always under the control of the programmer. If certain utilities, like the editor, string handling routines, or advanced graphics routines will be required in a specific application, then they may be included during the loading of the program modules which require them. This is similar to the way other languages can access library routines during compilation, but Forth's method is simpler and more elegant.

The manual has several examples showing how to access the Macintosh toolbox routines. New windows can be created and programs can be assigned to them which execute when the windows are activated.

MacForth contains a rich set of features for using files. These may be data files or text files, in the usual manner, or virtual files. The programmer has complete freedom to design disk storage according to his or her own requirements.

The use of the serial interface is supported and the methods to configure both the printer port and the communications port are described.

Level one also includes topics suitable for more advanced programmers. The debugging tools available are impressive. If a program is compiled with the trace feature invoked, subsequent execution in the debug mode causes a complete tracing of the program to be displayed as it executes, including a the contents of the stack at each step.

Level two includes all the features of level one plus several more features such as access to advanced Quickdraw graphics, an in line 68000 assembler, support for the standard Macintosh text edit features and a set of floating point math operators.

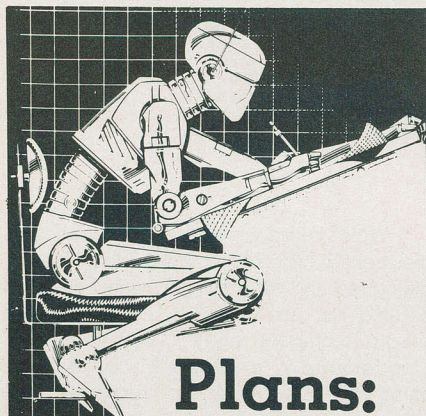
The advanced graphics include the ability to define and manipulate Quickdraw



polygons, regions and pictures. These are methods for operating on large or complex regions of the Macintosh screen.

The power of Forth is such that when told to warp the entire contents of the memory into a cosmic wormhole, it will attempt to do just that. A lot of time can be spent rebooting the system until that fatal bug in your program can be found and exterminated. There is a useful system utility in this context called "Snapshot". This program records a binary image of the computer memory on disk to allow a quick start to a pre-recorded configuration.

MacForth is also a powerful number cruncher. In its standard mode MacForth tends to favor the use of integer numbers for compactness and speed. The standard size memory cell is thirty-two bits, giving MacForth the capability to count between one and 2,147,483,647. There are also double precision math operators which allow values using sixty-four bits, which is much higher than I can count. For smaller values and when memory conservation is important, MacForth can use eight and sixteen bit numbers as well as bit wise operations.



## Plans:

Program: **MacForth**  
 Manufacturer: **Creative Solutions, Inc. 4701 Randolph Rd., Suite 12, Rockville, Maryland 20852**  
 Distributor: **FRANTEK, 1645 Russell Rd., Unit 2, Ottawa, Ontario K1G 0N1**  
 Suggested Retail: **\$201.15 (level 1)**  
**\$336.15 (level 2)**

There are times when floating point numbers are useful to have. Level two provides a full IEEE-754 extended floating point standard implementation. There is a complete set of operators for manipulating them, controlling rounding up or down and the conversion between integer, floating point and string representations.

Toolbox traps are handled in more detail in Level Two. Over 200 are used by MacForth with approximately 150 of these

being directly callable by the user. The configuration of MacForth's stack is mapped to show proper interfacing with each one. The documentation is limited as it is intended as a supplement to Apple's 'Inside Macintosh' rather than as a replacement for it.

For those with a mind to producing commercial products, Creative Solutions provides a level three developer's kit. For a one time fee of about five hundred dollars American, the purchaser obtains the right to create commercial applications using MacForth free of any further royalties.

The support from Creative Solutions is excellent. There is a "hotline" number to call for technical problems that crop up and need just a word or two from an experienced user to solve. For more general help they publish a newsletter which includes programming tips and product information. For those with a modem and an account on CompuServe, they operate a MacForth SIG where assistance can be obtained from a wide variety of users. Public domain programs in MacForth are available for downloading.

MacForth is a real slice for programming the Mac. It provides access to the most useful toolbox routines, fits comfortably in 128 kilobyte system and has all the Forth characteristics of extensibility that allow it to adapt to various needs and developments.

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# Plot It

**T**here are a lot of things for the Macintosh that you can never fully grok until you actually have them. It's a shame... it negates a lot of the advertising.

Let us consider, for example, *Plot-It*... you'd have expected this, considering the name of this feature. *Plot-It* is one of those really rather obscure bits of software. It purports to be a utility to send MacPaint files to one of a number of popular technical plotters rather than the Imagewriter printer. This sounds about as interesting as Billy Graham on speed.

Like I said, you've got to use it.

Some of the things that *Plot-It* will do for you... and some of the stuff you can get out of it... are just a bit shy of magnificent. Aside from being a well crafted piece of software, *Plot-It* gives a Mac all sorts of new avenues for hard copy. It also opens up some serious applications for the beast, horrific as that may sound.

You'll have countless boxes of mushy plotter pens by the time you get bored of this one.

## A Plot to Overthrow

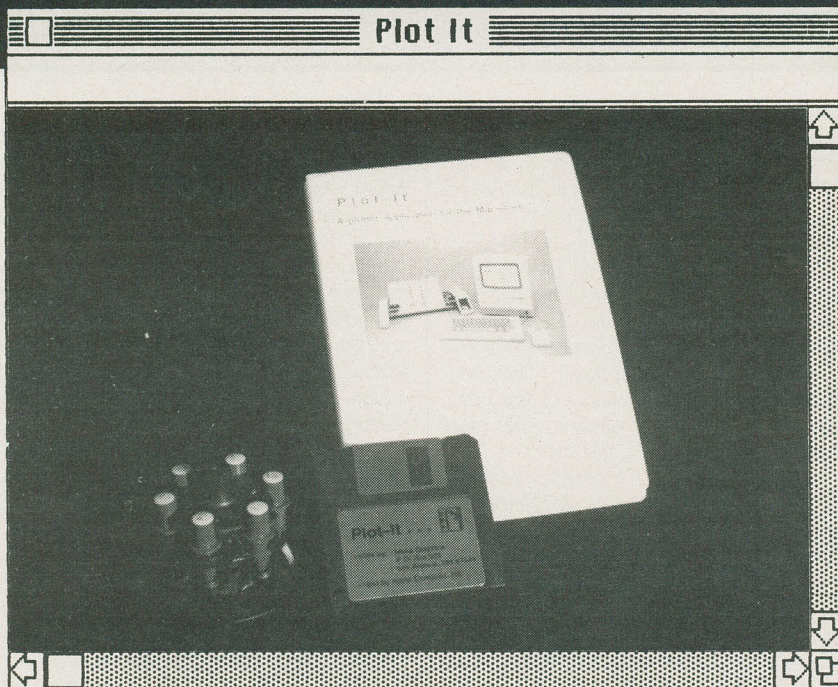
*Plot-It* will talk to a number of the better plotters. Our review sample was happy with the Apple 410, the Hewlett-Packard 7475A, The Houston Instruments DMP-29 and the Houston Instruments PC-695. I used it with the 7475A... we checked out this plotter several issues ago.

The first thing that one notices about setting up to use *Plot-It* is that the manual seems to be willing to have you connect the serial input of the plotter to the printer port on the back of the Mac if you don't feel like using the modem port. In other words, one can simply yank the cable from the back of the Imagewriter and zap it into the plotter. This seems a bit unlikely, to be sure.

It does, of course, work. It's extremely elegant, as it allows one to swap between the plotter and the printer without groping around behind the Mac. Alternately, if you have two cables... and no modem... *Plot-It* will talk to its plotter through the Mac's serial port, allowing one to leave the Imagewriter permanently connected. There are icons and whatever to handle this in the program itself.

The manual details the settings of the DIP switches for each of the plotters the package supports. As it happens, the ones for the 7475A were compatible with the settings I usually leave in the plotter to use it with AutoCAD... its primary function... and, as such, everything parted out immediately.

Letting *Plot-It* rip in its simplest incarnation is pretty top down. One boots its disk,



**Connect your Macintosh to a plotter... with this extraordinary utility... and you'll see MacPaint in wholly new ways. For one thing, you can check out the Mac in colour.**

**by Steve Rimmer**

mouses the icon and waits for the disk to stop grinding. The program hits you with three menus, one of which will be dimmed. The important ones are the settings and the file menu.

The former, among other things, allows one to pop for one of the four plotters the system supports. Having done this you can also pick the pen speed that things will be rendered in... slower pens work better on film for doing overhead transparencies. The other useful bit of this page is in deciding which of the two Mac ports the plotter is going to be fed through.

*Plot-It* allows the settings to be saved in a file so that you don't have to menu your brains out every time you start it up. In fact, you can have any number of configurations saved, as they'll each come to live in individually named files.



With everything selected, clicked, double clicked, highlighted, lowlighted, chosen, dialogued and set adrift on a small raft with nothing but anchovies for sustenance the program is about ready to plot something. One begins by opening a MacPaint document. A reduced version of the whole MacPaint image will turn up on the right hand side of the screen.

*Plot-It* does not have to plot everything exactly as it is given it. In fact, this is part of what makes it so powerful. You can block off part of the image and have the program expand it to fill the entire plotting area.

The easiest way to plot a bit mapped Mac image would be to simply scan it from the top to the bottom and turn the plotter into a sort of glorified dot matrix printer. This would work, but it wouldn't look very nice and your plotter pens would turn into Cream of Wheat.

*Plot-It* is worlds more intelligent than this. Given any image it will take the existing bit map data and extrapolate what it needs for drawing lines and things from it. This is a very difficult process in software and *Plot-It* does it very, very well. The virtually flawless



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**Software Now!** deals with a broad range of systems and applications, encompassing eight, sixteen and thirty-two bit machines, and software as diverse as video games, drafting systems and spreadsheets.

## Features In The Queue

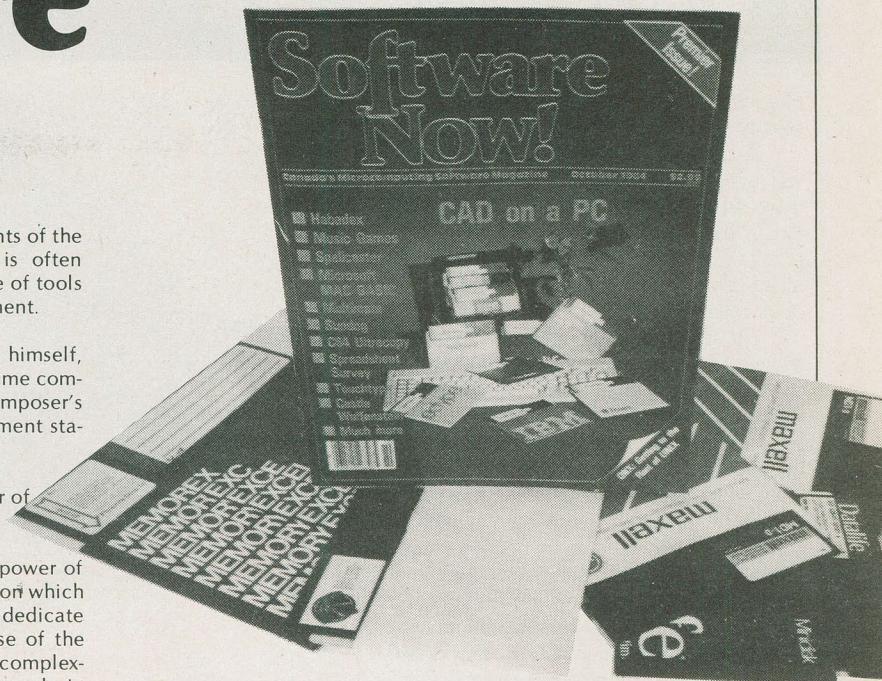
Here's some of the editorial line up for the next few issues of **Software Now!** You can expect it to change a bit... new software springs up almost daily, and **Software Now!** is always featuring the most important developments in this dynamic field.

Computer Aided Drafting On a Micro • Techniques in MacPaint • How to choose a Spreadsheet • Apple Software Crate • Getting to the Root of UNIX • The Digital Research Pantry • A Thousand and One Word Processors • IBM's Productivity Family • Can Mac Write? • Professional Software Roundup • Power Programs for the 64 • Approaching the C • Word Processing Support Programs • dBASE II Enhancements • Will it Run Multiuser? • Concurrent CP/M

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# Plot It

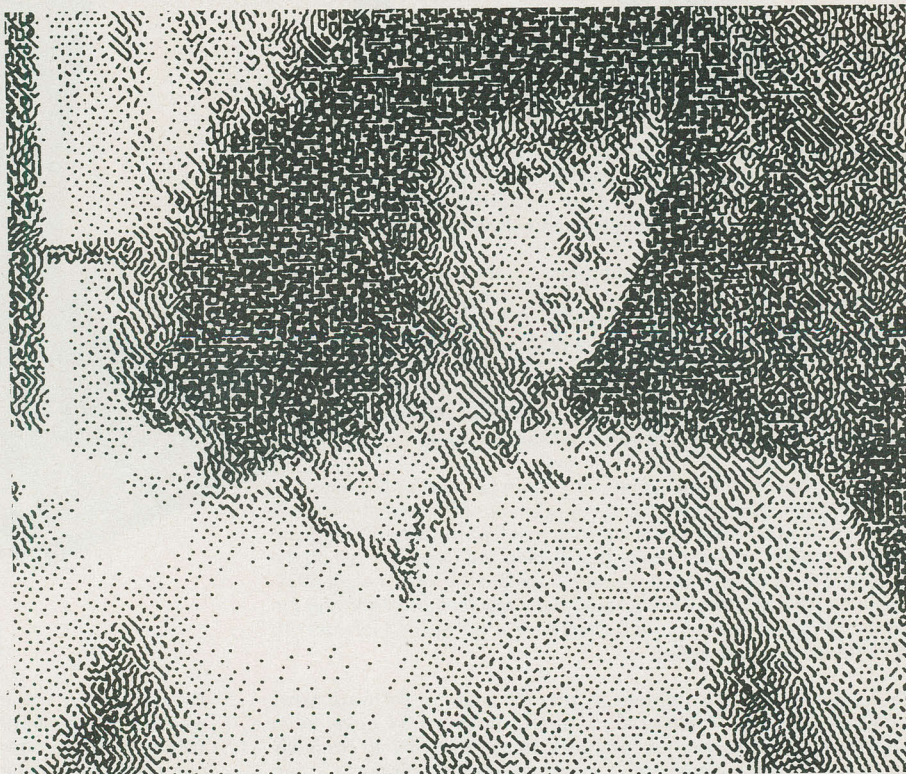
images it actually renders belies the complexity of the whole ordeal.

A plotted image generated by *Plot-It* will not look exactly like a printed image done on an Imagewriter. The process of filling in the blanks between the bit mapped pixels of a MacPaint file leads *Plot-It* to fudge a number of things. The results are quite interesting.

The most notable aspect of a plotted drawing file is in the way that *Plot-It* handles tones. As I said, it could just become a dot matrix printer for these things but the results would be gross and the effect a bit destructive. What it does instead is to fill in areas of tone with areas of hatching... the proper way to handle such things on a plotter.

Areas of tone tend to become whorls under *Plot-It*. They can often look a lot more detailed and interesting than they do under MacPaint. The final appearance of these things can vary enormously depending upon how much interpolation *Plot-It* has to do. If you tell it to fill the plot with an image that was an inch square on the original MacPaint picture it will have to do a lot of this sort of fudging.

Once again, however, the program's ability to handle this stuff without committing any visual gaffs is impressive.



## Full Colour Mac

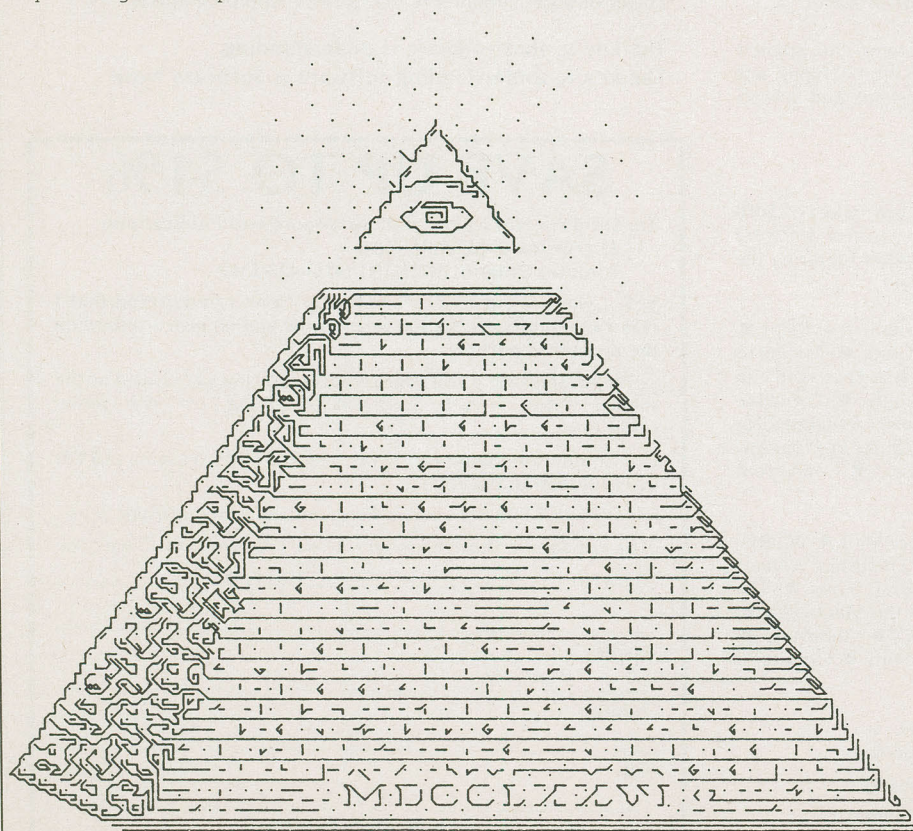
One of the things which I eventually got around to trying with *Plot-It* was having it create colour images. The 7475A plotter itself has the capacity to handle six colours of pens and, of course, it can plot one colour over another to create several more colours. *Plot-It* has very good multiple colour pen support, with a menu around to take care of such matters.

In order to have the program do a multiple colour image one would select a pen number... we'll assume that one has put the right pen in the right pen holder on the plotter... and block off that part of the image that is to be rendered in the colour in question. There is a special cursor for this. The plotter would thereupon plot only this part of the picture in the colour that it's been told to use, ignoring the rest entirely.

One could then block off another part of the image and have it plot that in another colour.

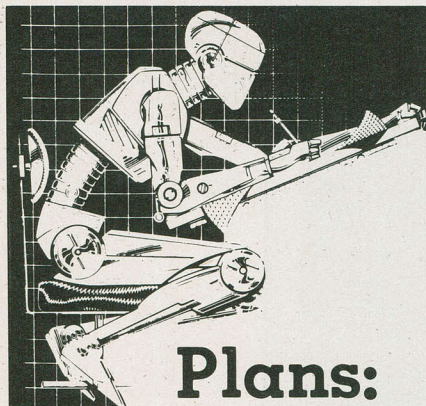
The only limitation to this is that the system, as it stands, insists on having rectangular areas blocked off. As such, blocking off irregular parts of an image would require approximating things with a lot of boxes... this is both crude and time consuming. Something along the lines of MacPaint's lasso would have been worlds better.

While laborious to do, colour images done with *Plot-It* can look glorious. The



The eye of Horus, from Mac The Knife





Program:  
Plotters Supported:

**Plot-It**  
**Apple 410 Color, Houston**  
**Instruments DMP-29 and**  
**PC-695, Hewlett-Packard**  
**HP7475A**

Manufacturer:

**Mesa Graphics, P.O. Box 506,**  
**Los Alamos, New Mexico**  
**87544 (505) 672-1998**

Distributor: \*

**Software Source, 25 Overlea**  
**Boulevard, Suite 601, Toronto,**  
**Ontario M4H 1B1**

Suggested Retail:

**\$114.00**

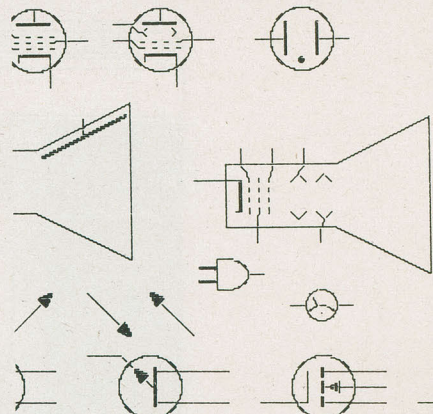
\*Software Source is currently retailing this product until  
a permanent Canadian distributor is found.

ability of combining the fluidity of Macintosh images with multiple colours... and the plotter, which tends to render them looking like old etchings... is a really pleasing visual effect.

There are few nasties tied up in *Plot-It*, and all of them are minor. The lack of a flexible arrangement for blocking off coloured areas is certainly one. You may also find you object to the speed of the whole effort... it runs at about a twentieth of the rate of an Imagewriter... but this is mostly the fault of the plotter.

The only really uncool thing about *Plot-It* is that it's copy protected, which seems completely pointless for a program which is as specialized as this one is and as reasonably priced.

*Plot-It* is super for drawings and other artsy stuff. It can be good for more serious technical drawings but you would have to plan to take quite a while to get used to it. It likes to add flourishes to anything that isn't a straight line... until you get into just how to avoid this your bar charts will look a bit baroque.



Part of our Macintosh symbol set as it looks plotted.

In fairness, *Plot-It* can't be expected to render things with the same sort of precision as, say, AutoCAD. However, its real applications don't seem to be in this area at all.

*Plot-It* is something which anyone who is interested in doing art on the Mac... and can spring for a good plotter... should consider acquiring. It's a decent disk. **CNI**

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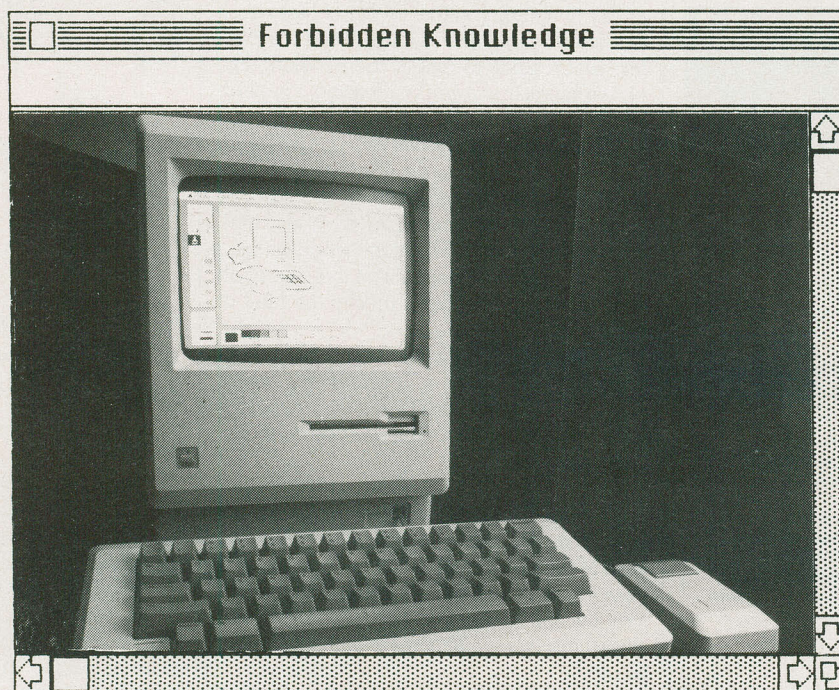
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23



# Forbidden Knowledge of the Mac



**There are oceans of tricks which will make the Mac easier to use and more productive. Here's a look at a few of them.**

**by Steve Rimmer**

I think that one of the things that makes the Macintosh so much fun to play with is the depth and complexity of its operating system and applications. While it does allow for even a complete idiot to get the thing sort of working in the first fifteen minutes... and many politicians to get the hang of it inside of a week... there is an enormous number of mouseholes and secret passages in the beast that eventually present themselves to the seasoned user.

These tricks and incantations can be extremely useful. Few of them are really mind shattering, but there are lots of bits that'll make your rodent wanderings considerably more productive. Some are just a bit peculiar.

This feature is a catalog of some of the more useful bits of virtual flotsam about the workings of the Mac... and how to make it all work a bit better for you.

## Find It

The Macintosh's operating system... what the books call the Finder and its support files... are all written in Pascal. This accounts for their size. They're rather large.

Because of the relatively limited amount of memory in a standard Mac in relation to the size of its system documents, the functions of the operating system level code are broken up into several files... the printer driver, for example, lives in its own file.

The disk operating system of the Mac is actually very similar in function to much more conventional ones, like MS-DOS... they've just hung a lot of conceptual rags on it. Thus, for example, the folders on the Mac are equivalent to MS-DOS's subdirectories... this will be of no help if you aren't into MS-DOS, I know.

The first problem which most Macintosh users encounter is the propensity of the little Mac disks to get full. They do this because most of a typical disk is taken up with system files... out of about four hundred kilobytes of space, one only gets about a hundred K to actually use under MacPaint or MacWrite.

If you have a two disk system you can get around this by the simple expedient of having program disks and file disks. The system stuff... the Finder, Imagewriter, the clipboard and so on... do not have to be on every disk. You only have to have one disk

in the system which contains them. As such, you can format up a blank disk and keep all your files on that. Boot the system with the disk that has the finder and your applications on it and put all the documents on the other drive.

You probably have never noticed that you can boot the Mac from either drive of a two drive system. There isn't a lot of use for this, but it's interesting.

In organizing a disk... especially a disk with a lot of files... you can use the folders to fairly good advantage. Unlike as in the case of MS-DOS's subdirectories, the folders don't mean much to the applications... only to the humans that use them. Thus, for example, if you were to bury the clipboard in a folder the Mac would still be able to find it. As one never accesses the system documents directly it's well worth leaving them in a folder of their own and forgetting about them.

There's a little plastic thing with two little hinges on it that comes with the Mac and, unless you read every bit of the manual, it appears to be splendidly useless. Actually, it isn't... it gives you access to the Mac's



68000 processor's interrupt lines. You plug it into the lower rear corner of the passenger side of the Macintosh. If you hit the forward of the two buttons the computer will reboot... essentially what happens if you turn it off and on again. The other key, the interrupt, will usually show you the bomb dialog box.

This is a very useful little gadget as it will allow you to get out of a number of loops on the Mac, or trash applications that have gotten a bit weird. It's especially handy if you use copy protected software. Ejecting a copy protected disk and trying to run a normal application may cause the computer to behave unpredictably. Zap the reset button first.

The bomb box will turn up at the oddest times. In most cases it indicates that the world has come to an end for some reason. Unlike as in the case of lesser machines, the Mac will give you some idea of the cause of the bomb, in the form of an error code. Table one lists the error codes and their meanings.

It's rare that you can recover successfully from a bombing but you should be able to find out what caused it. Bear in mind that some bombs come down as a result of static glitches, power line anomalies and other transitory phenomena. If you start experiencing random bombs you might need a static mat and a power line filter.

In other low level bits, you may well have considered hanging a modem from the serial port of your Macintosh. You don't have to buy a Macintosh modem... virtually anything with an RS-232C interface that's designed to work with microcomputers will be happy with the Mac. The only hassle is the cable.

You can build yourself a cable for a modem... the pin connections are shown here. However, if you can't relate to solder and bits of coloured wire you can use the cable you probably already have. The Mac's printer cable can double as a modem cable by simply switching ports. To use a standard modem with this cable you need a null modem adapter... you can get them at Radio Shack, amongst other sources.

There are several ways to dump the Mac's screen, to wit, you can copy it to a MacPaint document or you can send it off to the printer. Hit the caps lock key and hold down command and shift while you zap the three and you'll have a new file on your disk called Screen 0... which is the whole tube, preserved for posterity. If you hit four instead of three it'll all turn up on the printer.

If you don't have the caps lock key down both of these modes will still work, but they'll happen a bit differently. With the

caps lock up all that gets dumped is the current window, rather than the entire image.

## MacPaint Your Wagon

There are a lot of tricks you can use in MacPaint. For example, there are a number of ways to get into fat bits... aside from using the menu line that's designed to take care of it. Perhaps the most useful is to click the pencil icon and move it over to where you want to fat bit. Hold down the command key and click the mouse. It's a lot easier than getting into fat bits and then handing around.

Another interesting phenomenon in MacPaint allows one to recover drawings even when one thinks that the system has well and truly trashed them. As you may have noticed, every time you go to use the hand the Mac has to access it's disk. This is because a MacPaint document is stored, for the most part, on the disk rather than in memory. The only part that lives in RAM is the part you can actually see.

As such, if the system bombs or you otherwise have to abandon a picture, the image will still exist in two scratch files called Paint 1 and Paint 2.

There is a fairly common situation one can get into under MacPaint in which the application kicks you out because there isn't enough disk space and won't let you save your current file for the same reason. If you just quit in this case your file will be lost.

If, on the other hand, you hit the reset button the system will reboot with the two scratch files intact. Make a bit of room on the disk... killing the scrap book is usually effective... and click MacPaint. Something weird will happen... MacPaint will appear to

open a document called 'Rescue' and will inhale your file... it does this whenever it finds itself looking at its scratch files when it boots. The files would normally have been deleted when MacPaint returned you to the finder.

The Rescue document will contain your previous... precrash... file. Just save it back into the document you were editing.

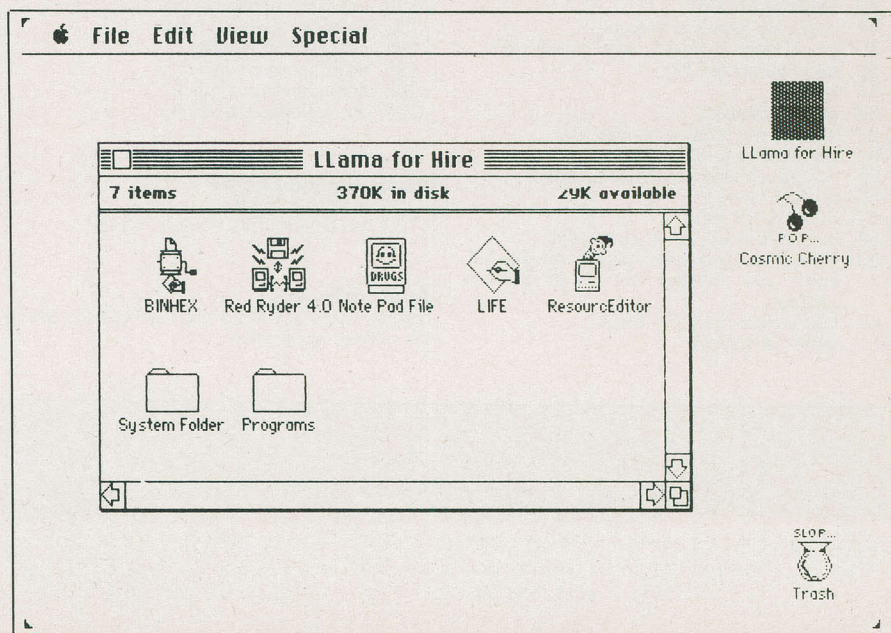
There's a second lesson in this. When you are MacPainting a document you will need at least as much disk overhead... free space... as you have document because the current version is always kept in those scratch files.

Here's a trick from the Mac the Knife manual. Under MacPaint it's often hard to tell where a circle or ellipse is going to wind up. However, MacPaint uses the Mac's Quickdraw routines to draw these... technically speaking these are what the system calls "ovals".

An oval is specified not by a centre and a radius but by the rectangle it resides in. As such, if you draw a box and erase all but the upper left and lower right corners, you will be able to draw an ellipse inside it by placing the cursor up the upper left point and dragging it to the lower right. A box is a lot easier to position than is an oval... you can erase the remaining corners when the ellipse is where you want it.

If you want to start MacPainting a large picture it's always a little difficult to know where to start on the worksheet. The MacPaint worksheet is of a finite size... it's a drag top get a picture half done and find that you have too much space in one direction and not enough in the other.

In fact, you can move an image over





# Forbidden Knowledge of the Mac

**Table One**  
**The Mac's error codes**

## General system errors

- 1 queue element not found during deletion
- 2 invalid queue element
- 3 core routine number out of range
- 4 unimplemented core routine

## I/O system errors

- 17 control
- 18 status
- 19 read
- 20 write
- 21 bad unit
- 22 unit empty
- 23 open
- 24 close
- 25 tried to remove an open driver
- 26 couldn't find driver in resources
- 27 IO call aborted by KillIO
- 28 driver not opened

## File system errors

- 33 directory full
- 34 disk full
- 35 no such volume
- 36 I/O error
- 37 bad name
- 38 file not open
- 39 end of file
- 40 position error (before start of file)
- 41 memory full (open) or file won't fit (load)
- 42 too many files open
- 43 file not found
- 44 diskette write protected
- 45 file locked
- 46 volume locked
- 47 file busy (delete)
- 48 duplicate filename (rename)
- 49 file already open with write permission
- 50 user parameter list
- 51 refnum
- 52 get file position
- 53 volume not online (was ejected)
- 54 permissions (on file open)
- 55 volume already online at MountVol
- 56 no such drive
- 57 of a Mac diskette
- 58 volume belongs to an external fs
- 59 file system deep error - during rename old entry was deleted but could not be restored
- 60 bad master directory block
- 61 write permissions

## Disk, serial ports, clock specific errors

- 64 drive not installed
- 65 r/w requested for an offline drive
- 66 couldn't find 5 nibbles in 200 tries
- 67 couldn't find valid address mark
- 68 read verify compare failed
- 69 address mark checksum didn't check
- 70 bad addr mark bit slip nibbles
- 71 couldn't find a data mark header
- 72 bad data mark checksum
- 73 bad data mark bit slip nibbles
- 74 write underrun
- 75 step handshake failed
- 76 track zero detect doesn't change
- 77 unable to initialize IWM
- 78 tried to read second side on a single sided drive
- 79 unable to correctly adjust disk speed
- 80 track number wrong on address mark
- 81 sector number never found on a track
- 85 unable to read same clock value twice
- 86 time written did not verify
- 87 parameter ram written didn't read-verify
- 88 InitUtil found the parameter RAM uninitialized
- 89 SCC receiver (framing, parity, OR)
- 90 break received (SCC)

## Storage allocator errors

- 108 not enough room in heap zone
- 109 handle was NIL in HandleZone or other
- 111 WhichZone failed (applied to free block)
- 112 trying to purge a locked or non-purgeable block
- 110 address was odd or out of range
- 113 address in zone check failed
- 114 pointer check failed
- 115 block check failed
- 116 size check failed

## Resource manager errors (other than I/O)

- 192 resource not found
- 193 resource file not found
- 194 AddResource failed
- 195 AddReference failed
- 196 RmveResource failed
- 197 RmveReference failed

## Scrap manager errors

- 100 no scrap exists
- 102 no object of that type in scrap

## Application error

errors -1024 to -4095 are reserved for use by the current application

## Deep error alert ID

- 32767 general system error
- 1 bus
- 2 address
- 3 illegal instruction
- 4 zero divide
- 5 check trap
- 6 overflow trap
- 7 privilege violation
- 8 trace mode
- 9 line 1010 trap
- 10 line 1111 trap
- 11 miscellaneous hardware exception
- 12 unimplemented core routine
- 13 uninstalled interrupt
- 14 I/O core
- 15 segment loader
- 16 floating point
- 17 package 0 not present
- 18 package 1 not present
- 19 package 2 not present
- 20 package 3 not present
- 21 package 4 not present
- 22 package 5 not present
- 23 package 6 not present
- 24 package 7 not present
- 25 out of memory
- 26 can't launch file
- 27 stack has moved into application heap
- 28 file system map has been trashed
- 30 request user to reinsert offline volume
- 31 not the disk I wanted

**Table Two**  
**Serial Port Pins**

- 1 frame ground
- 2 + 5 volts
- 3 signal ground
- 4 TX+
- 5 TX... transmitted data
- 6 + 12 volts
- 7 CTS... clear to send
- 8 AX+
- 9 AX... received data

To create a modem cable for the Mac and a standard modem... like a Hayes... get a DB 9 and a DB 25 connector and join the following pins:

## DB 9 · DB 25

- 1 1
- 3 7
- 5 2
- 7 20
- 9 3



the worksheet even if it's too big to get into the clipboard. Double click the hand icon to get into the image overview. This will show you a box which represents the screen over the whole worksheet. If you put the cursor inside this and click the mouse you will move the box... the normal course of things. If, however, you click the mouse with the cursor outside the box you'll move the image. You can move part of the worksheet over the edge of its borders and out into infinity. If you move the area where you have too much space off the Mac's table you'll have more space on the other side where you need it.

If you get into the Mac a lot and try to move MacWrite files from your Mac to someone else's computer you will find that they aren't entirely portable. There's a good reason for this... the Mac puts a lot of stuff in a MacWrite document to handle all the special effects.

If you are going to send a file out through the serial port you really only want to take care of the ASCII text anyway, so the file should be saved in MacWrite's text only mode. In this case what comes down at the other end will be readable ASCII, although it will lack line feeds after the carriage returns.

### Reset

You undoubtedly have quite a number of Mac tricks of your own. It's fairly easy to build up quite a store of quirks in the system... it's a very complex piece of work.

There are a number of really wild things you can get into on the Macintosh... well, I suppose this gets into system hacking, actually. For example, the modular design of the system allows one to do some severe customizations on things like the icons and the system messages. Consider the example finder below. I've cleaned it up a bit... the general corporate karma of Apple seems to dissipate from the Mac if you mess with its mind. I find a tendency to get quite barbaric given enough time.

We'll look at these another time. They take some heavier tools than the ones that come with the system... I don't think that the guys who signed their names on the inside really wanted the rest of us to be able to change the trash icon into a brass pot that says "slop".

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# Hippo C

**Writing serious applications programs for the Macintosh... or just dabbling in writing programs... has never been a simple task. Here's a look at a package which drags it all a lot closer to reality.**

**by Steve Rimmer**

**T**here are, to my knowledge, now four implementations of the C language for the Macintosh and even if Hippopotamus C hadn't looked like the best of the lot I'd have reviewed it first anyway. A hippo is so much more amenable sounding than is an Aztek.

In fact, however, having checked out several of the contenders for writing code for the Mac in this freaky little language, I'd have picked this one even if it had been called "Blue Suit C". The grinning icon notwithstanding, Hippo C combines a number of powerful programming tools. These include a pretty well complete and faithful implementation of Kernigan and Ritchie C, a MacWrite like editor, a user friendly menu driven environment for lazy cowards like me, a Unix-like nasty environment for everyone else and complete access to all of the Mac's toolbox routines, including the QuickDraw stuff, all tied up as built in functions of the compiler.

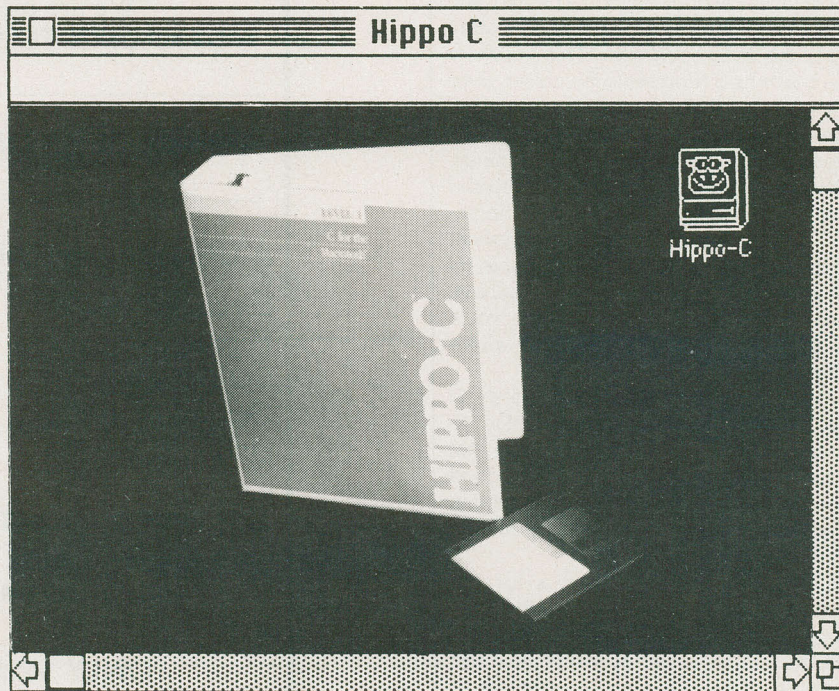
On top of all this, Hippo C is pretty cheap.

## In The Jungle

Programming the Macintosh is a bit of a problem, at least at the moment. There is a more profound dearth of generally available languages for it than there has been for practically any other system since they used to build them with tubes. Microsoft BASIC is a wonderful thing... but it's still BASIC, along with all of its inherent disadvantages. Macintosh PASCAL, from Apple itself, seems only to be available to software developers and, with Apple's characteristically fluid delivery times, this may always be so. There's Forth, seen elsewhere in this edition, and several C's.

If you're into BASIC, C will look pretty awesome... and scary. It's not what anyone would call user friendly. More of an elaborate macro assembler than a real higher level language, C is an extremely powerful trip if you don't mind doing some of the work yourself.

Learning C is a lot freakier than would



be learning BASIC from scratch. There are a number of reasons for this. To begin with, almost all C's... Hippo C included... are compilers rather than interpreters. In other words, they take your program and make a machine language file from it, rather than immediately running it line by line. This means that having typed in a program you have to wait for it to compile, try it, get back into the editor, change the thing to fix the bugs, recompile it and so on. It's quite tedious.

However, one of the principal reasons for using a compiler language like C is that when all the dust settles you have a reasonably fast program, as opposed to a BASIC source file. What's more... at least under some circumstances... when the C compiler has finished its party the remains are a standalone application that doesn't require the existence of any other software, like BASIC, to run.

Learning C is not an easy task, and learning Hippo C, if you don't already have some notion of how C works, is not at all comparable to checking out Microsoft BASIC for the first time. Hippo C behaves considerably more decently than do most C compilers... which are downright antagonistic... but it's still decidedly obtuse.

## Animals

There are, to begin with, two levels of Hippo C. Both are conceptually about the same. However, they will have applications

in slightly different areas. Level one is designed for people just getting into C. Pretty well everything can be handled from the menu driven editor and there is a minimum of low level hassles to contend with. However, this C lacks the capability to add assembly language bits to one's program... frequently a useful facility... and it can't generate standalone applications. In other words, it's only good if you want to write programs for your own amusement.

However, having bought level one C one can subsequently upgrade it to level two C. This is a rather more robust package. It has the same functions and things that the level one version maintains but it does allow for assembly language in one's code and it can create distributable code. This is enhanced by the package's license agreement, which stipulates that one can distribute the code generated by the compiler without paying a royalty to Hippopotamus Software for the pleasure... something which some compilers aren't up for.

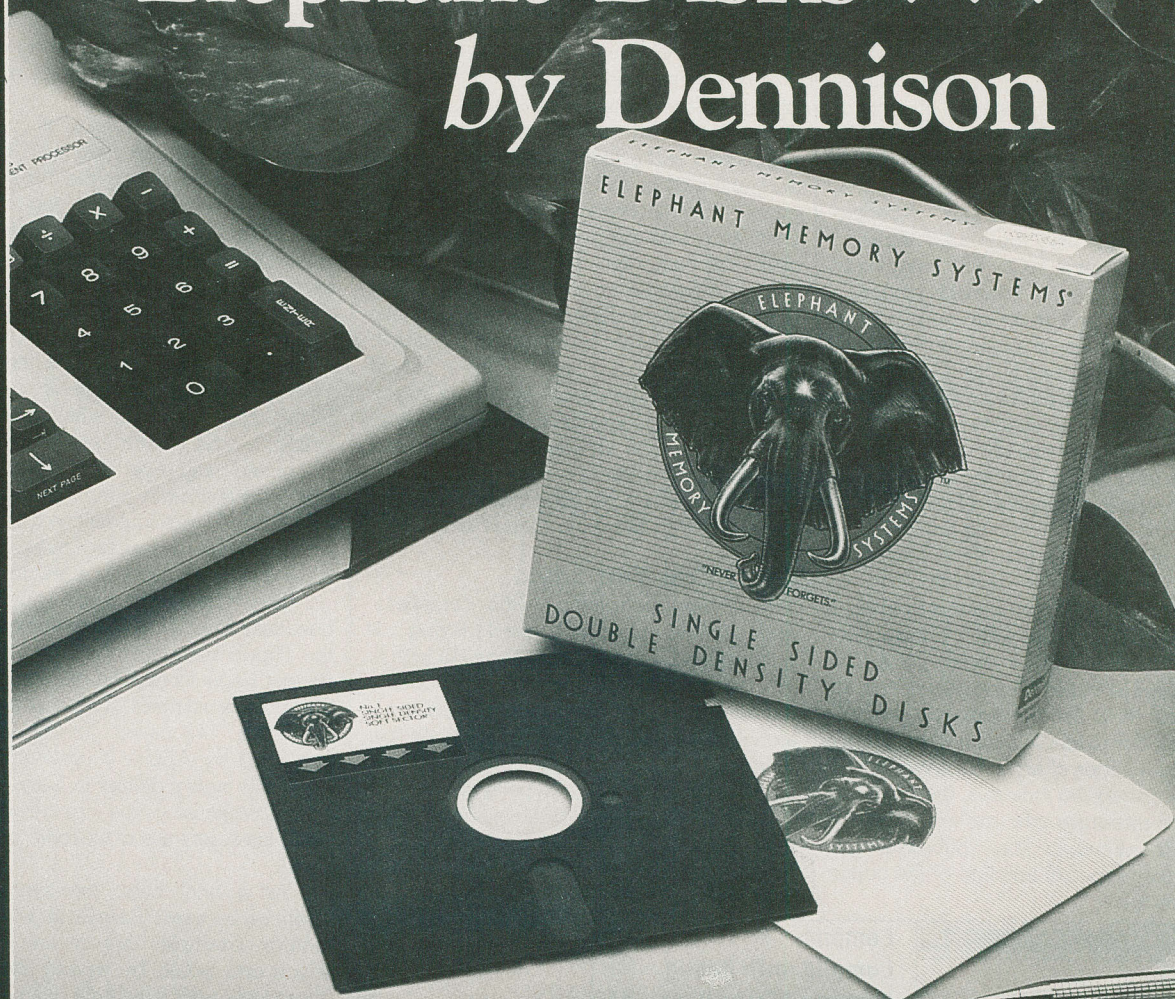
In addition, the level two version seems to be somewhat faster and produces moderately tighter code than does level one.

One of the little peculiarities of both versions of Hippo C is something called HOS, or Hippo Operating System. Real heavily involved C programmers will be intimately familiar with Unix, the mainframe operating system under which C was



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# Hippo C

originally developed. HOS is a Unix-like environment which uses some of its command structure.

The level two compiler insists that you work in HOS... level one occasionally dumps you into it. Compared to the Mac's finder, HOS is barbaric. Ignoring the mouse completely, it wants you to type in some of the most cryptic commands imaginable. While HOS gives the whole effort a familiar Unix flavour for users who are into it, it makes it a lot harder to get into for people who are primarily into the Mac. I think I'd have liked it better if HOS was completely optional, and could be optionally ignored.

This is especially frustrating under level two, which has some population density problems. The level two Hippo C comes on two disks... both of which are needed... and it still offers almost no space on the disks to work with. You can kill a few demo files. I'd really like to kill HOS, but, sadly, you can't.

The first step in creating a Hippo C program is to get into ed, the editor. This behaves enough like MacWrite that most users won't need any instructions in its operation at all. It's about the most pleasant text editor ever to come with a C compiler.

A lot of effort has obviously gone into the package to make it friendly, almost an apology for the otherwise brutal nature of C in general. For example, rather than simply spewing out pages of error messages if you commit some lexical *faux pas*, the compiler puts error messages into one's text file adjoining the offending lines. Subsequently, one can use a special function of the editor to remove them.

The level one editor allows one to compile one's programs from one of its menus, rather than having to exit to HOS and handle the whole thing by hand. This is good... running a C compiler is a study in tricky syntax.

The syntactical checking of the compiler seems to be just a bit lenient. The extremes are civil servant style compilers, which barf at the slightest lexical ambiguity and, at the other end, very easy going compilers which let very nearly anything get past and can produce programs which crash the computer. The latter is probably mildly preferable as once one gets used to C one will not produce the sorts of gaffs that the compiler should have caught but didn't. Hippo C is a bit lax... with a bit of forethought or the complete lack of it you can produce programs which, when run, will bring up the dreaded bomb icon and require that the Mac be rebooted.

The level two package seems to be a bit more prone to bombing than is level one.

## Oh C Can You Say...

The general operation of the compiler... once you get through the initial playing... is quite secondary to what you can do with it. The programming potential of suddenly having all of the Mac's resources on tap... along with a fast and efficient way to use them... rips the mind clear out of its cranial bucket and hurls it into hyperspace.

Or something along those lines.

Users of Microsoft BASIC for the Macintosh will be familiar with the existence of ROM calls... those largely undocumented

little trolls at the back of the book which seem to have something to do with the Mac's operating system. In fact, the ones provided by Microsoft are but a tiny fraction of the Mac's facilities as a whole. Virtually everything one experiences in interfacing with the Mac is as a result of what Apple calls "toolbox routines".

Hippo C lets you get at all of the almost four hundred toolbox routines. This includes things for drawing on the tube, handling windows of all sorts, checking out buttons and dialog boxes, managing fonts... the list, while anything but endless, occupies several pages of the manual.

There are no limits to using the toolbox routines from Hippo C *per se*... there are one two caveats, though. The first is that the Mac wants to have parameters passed to its ROMs from PASCAL, which is what it was written in and what it likes to see as a programming language. This does present a few complexities in handling some sorts of data from C, predominately strings. This is by no means a serious limitation... it just takes a bit of thought in a few instances.

The other, and slightly more consequential aspect of all this toolbox stuff is that the Hippo manual, by its own admission, doesn't begin to explain the complexities of the toolbox routines. There is a book that does this... it's called "Inside Macintosh", published by Apple. It costs about a hundred and eighty dollars in Canada, and it's all but essential if you are going to try to make intelligent use of the toolbox from Hippo C.

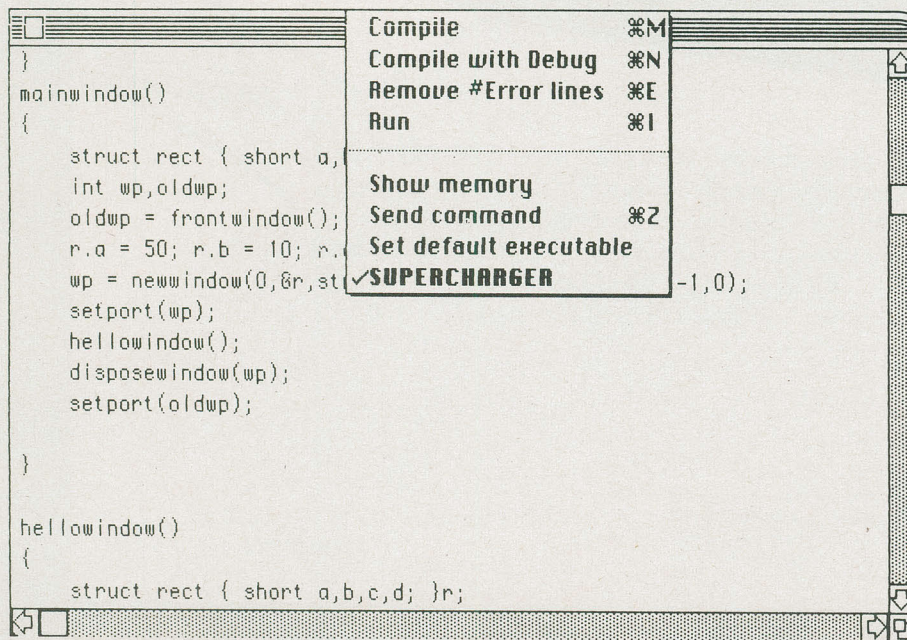
As a final note, the syntactical differences between Pascal, in which all the toolbox examples are given, and C, in which one would be writing, do give one cause to ponder from time to time. The Hippo manual is uncomfortably terse concerning the application of the toolbox calls.

## C For Miles

The Hippo C compilers support everything that C is supposed to support with the exception that level one doesn't handle floats... floating point variables. Don't sweat this... a lot of other C compilers for microcomputers aren't up for them either.

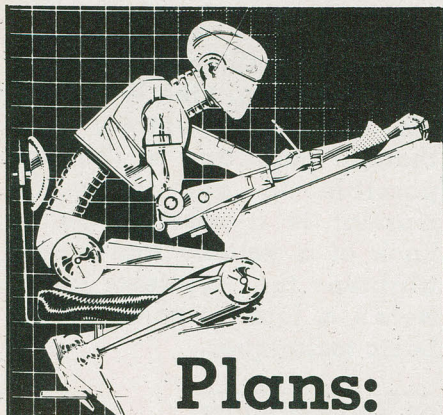
Creating Hippo C programs is about as easy as handling any compiler language, and more so than many. Aside from the existence of a really decent editor, the system has a built in debugger, something which most C compilers lack. The compiler itself isn't blindingly fast but it runs at an acceptable speed. The resulting code is quite fast... in general, slower C compilers seem to produce tighter code.

The hundred and twenty-eight



The editing window of Hippo C.





## Plans:

Program:  
Manufacturer:

**Hippo C**  
**Hippopotamus Software,**  
1250 Oakmead Parkway,  
Suite 210, Sunnyvale,  
California 94086  
(408) 730-2601

Distributor:\*

**Software Source, 25**  
**Overlea Boulevard, Suite**  
**601, Toronto, Ontario M4H**  
**1B1 (416) 423-3262**  
Suggested Retail: **\$180.00 (Level 1); \$470.00**  
**(Level 2)**

\*Software Source is currently retailing this product until a permanent Canadian distributor is found.

kilobytes of memory in older Macs is a bit of a limitation for Hippo C... it means that the editor can only handle about a hundred and fifty lines of code at a time. This is not a hassle... C code is properly written in little chunks, with subservient files included into more dominate ones. The more optimistic among us would call this limitation an aid to structured programming.

Obviously, however, the package is a lot happier with a fat Mac.

The manuals which come with Hippo C are pretty good. They are, like most C compiler manuals, a bit brief in the actual working of C, although they explain the running of the editor and the compiler in lavish detail. They have some information on the toolbox routines and their use, including an except from Inside Macintosh although, as I said, you should plan to acquire the complete works.

The weirdest part of the whole affair is the copy protection. The disks are very seriously copy protected. However, if you send the lads at Hippo twenty-five dollars... and sign a very legal sounding agreement... they'll send you an unprotected copy. This

is a bit peculiar but, as copy protection goes it's about the least offensive approach I've run across.

At least at the moment, Hippo C seems to be the most cost effective way to write serious applications for the Macintosh. It's a nicely fitted out package, well debugged and human engineered. The company which does it appears to be a decent collection of heads. All told it seems to be about the best way there is to program the Macintosh.

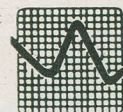
Beware... the hackers approach. **CN!**

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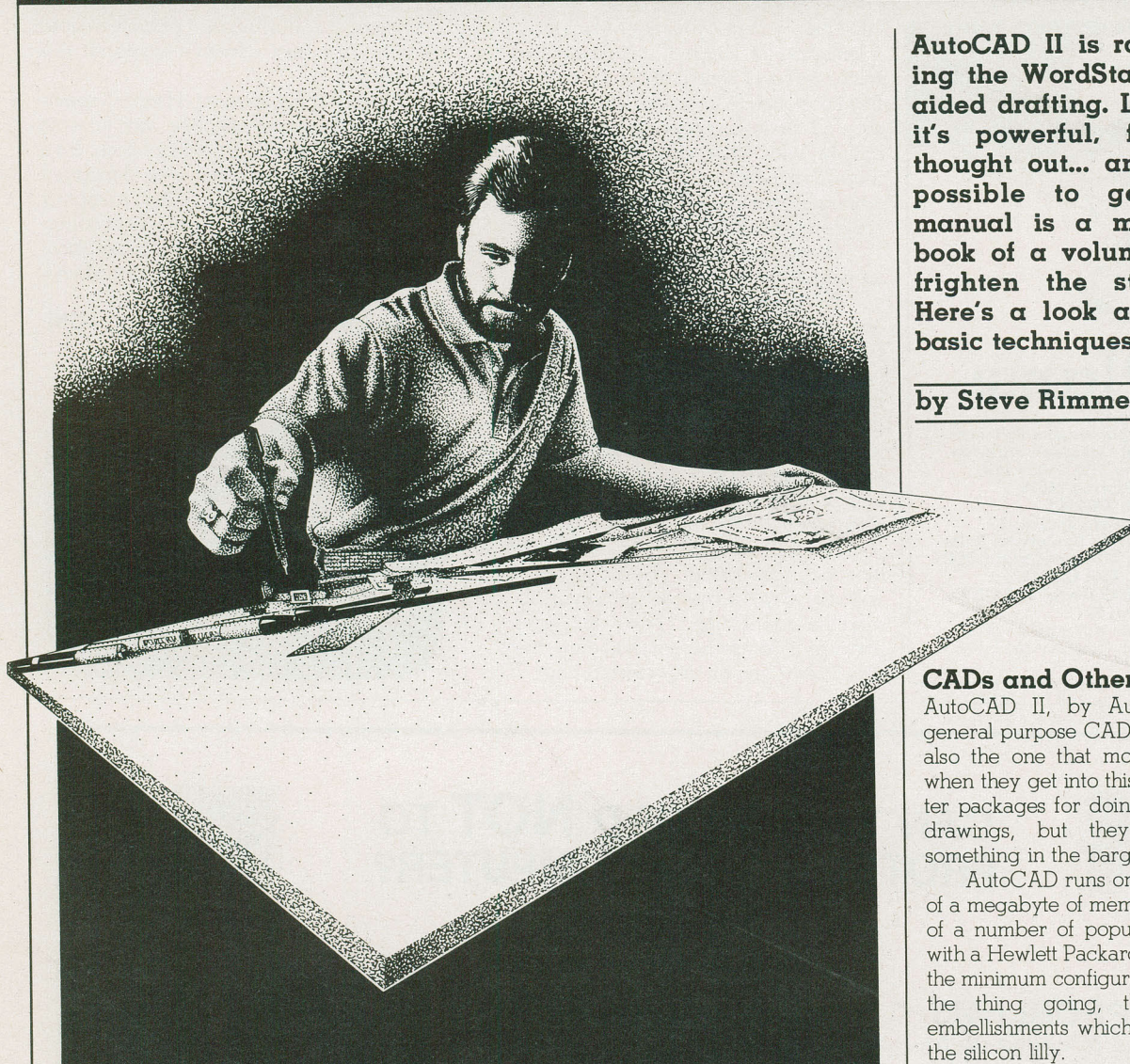
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# The Art of AutoCAD for the PC



**AutoCAD II is rapidly becoming the WordStar of computer aided drafting. Like WordStar, it's powerful, flexible, well thought out... and all but impossible to get into. The manual is a massive phone book of a volume that would frighten the stoutest heart. Here's a look at some of the basic techniques.**

**by Steve Rimmer**

## **CADs and Other Villains**

AutoCAD II, by Autodesk, is the best general purpose CAD system I've tried. It's also the one that most people talk about when they get into this area. There are better packages for doing specialized sorts of drawings, but they all tend to lose something in the bargain.

AutoCAD runs on a PC with a quarter of a megabyte of memory. It will talk to any of a number of popular plotters... I use it with a Hewlett Packard 7475A. While this is the minimum configuration one wants to get the thing going, there is a host of embellishments which can be used to gild the silicon lilly.

To begin with, AutoCAD is seethingly processor intensive, doing a lot of heavy calculations before it lays a point down on the screen. It will do these in software if it has to, but it's blindingly quicker if it has an 8087 math co-processor to take care of things. Well, perhaps "blindingly" isn't quite right, but it's a bit snappier, anyway.

If you contemplate doing a lot of drawing with AutoCAD you'll almost certainly want one of these expensive little chips.

Secondly, as one might expect, placing objects down on AutoCAD's virtual work space involves a lot of pointing... unless you want to specify everything in Cartesian co-ordinates, which isn't in the least bit practical. As such, while one can use the keyboard, a mouse is a good trip. AutoCAD supports several sorts of mice.

Finally, while you can run AutoCAD from floppies, a hard drive is almost essen-

**T**here are a number of things that any sane being attempts to avoid. For example, I've always thought that Liberal members of parliament fell nicely into this category, right alongside rabid wombats and Toyotas of all sizes and colours. You probably have your own list.

One of the things which belongs on most of our lists is the almost unspeakable toil of getting ink to come out of a bottle through the point of a technical pen and on to paper such that it forms a semblance of a technical drawing. Whether you are attempting to render architectural drawings, electronic schematics, business graphs or mechanical plans, the agony of marrying Rapidographs and vellum while sitting hunched over an inhumanly designed drafting table for hours is one which most sane humans would gladly swap for even the

smallest of Toyotas or a whole week's worth of videotapes of the House of Commons.

This, of course, is why computer aided drafting things, such as AutoCAD II, are so unspeakably wonderful. With a bit of practice... and a bit of the right hardware... you can draw things a lot faster and easier on the screen of a PC than you'd ever have been able to on paper even if the pen wasn't always choking on its own ink. More to the point, variations, multiple revisions and all of the other eccentricities of technical renderings are worlds easier. You don't redraw... you just replot.

If the creator of the universe had had CAD we'd have documentation for the place now and it wouldn't be nearly as confusing.



tial. The package accesses its disks a lot... almost every time you lay a command on it, in fact... which makes waiting for floppies a bit tedious.

A colour monitor is also a valuable accessory for the system. Multiple colours make some things, such as drawings with a lot of layers... we'll get to that... a lot easier to work with. AutoCAD images can get pretty detailed... the monitor one pops for should be a really crisp one.

AutoCAD comes in a number of permutations. The basic package does most of the things one would want it to take care of. However, you can buy two levels of enhancements for it, both of which add certain additional capabilities. In many sorts of drawings the lack of these can get a bit limiting and, considering the cost of the package it's worth springing a bit extra and getting the enhancements.

### Draw, Pardner

AutoCAD's work space is virtually infinite. However, when one starts on a drawing the useable space is limited. You can expand this with the LIMITS command as you go. I find it's reasonably easy to ignore this until I run out of room and then stretch the limits to suit what has to go in them.

There are two fairly useful commands to consider when one is starting a drawing, to wit, SNAP and GRID. SNAP sets up a matrix of invisible markers on the screen. The cursor would normally move in increments of a pixel... with SNAP on it will move in increments of as many units as you've set SNAP to. SNAP can be turned on and off as you go.

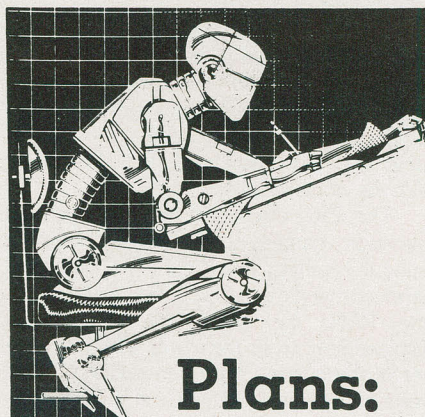
The GRID command makes the SNAP markers visible when it's active.

In doing most sorts of drawings... electronic schematics, for example... it's convenient to use SNAP. After all, the lines which connect things tend to be finite quanta apart. It's a lot easier to let the software take care of this than it would be to handle it by eye.

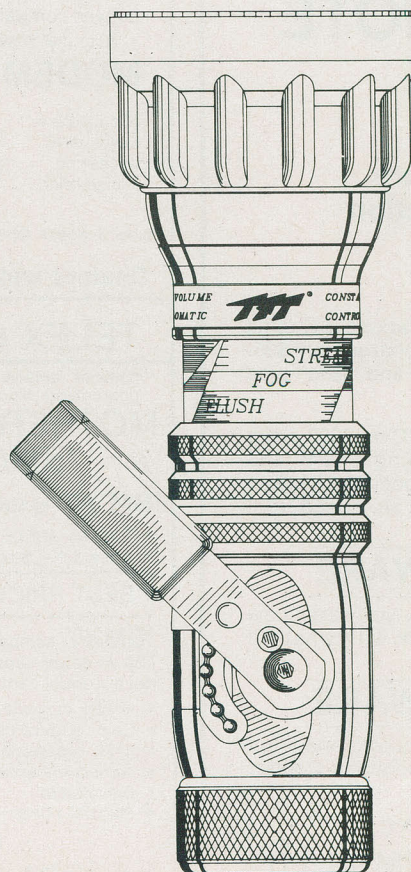
This actually brings us to the first important rule of AutoCAD. What you see is rarely what you get. The effective resolution of AutoCAD is the eventual resolution of your plotter... although the software will probably be able to get things a lot finer than that. On the other hand, the best you can see on the screen will be the drawing data approximated to the nearest pixel.

If SNAP were to be off, for example, it would be possible to join two lines such that they appeared to butt on the screen but were actually off by a good bit when they were plotted.

The screen image, then, is always an approximation.



Program: **AutoCAD II**  
 Manufacturer: **Autodesk, Incorporated,**  
 150 Shoreline Highway,  
 Building 'B', Mill Valley,  
 California 94941,  
 (415) 331-0356  
 Distributor: **Corporate Computer Systems,**  
 500 Sheppard Avenue East,  
 Toronto, Ontario (416) 229-6477  
 Suggested Retail: **N/A**



The most fundamental drawing command of AutoCAD is LINE. The usual dialog for a line is

**LINE**  
**From point:**  
**To point:**

When the system asks for "From point:" one would move the cursor over to where the line is to start and hit return or click the mouse. When it asks for "To point:" one would move to the destination and click the mouse again. It will keep asking for destinations until you click the mouse twice, at which point it will return to the command line.

At this bit of time and space it's worth noting a few peculiarities of Autocad's command system. The first is that the package will only recognize a point as being valid if you've moved to it after it asked for the point. If, for example, you were to leave the cursor where it was and click the mouse AutoCAD would lay an invalid point message on you because it would have assumed that no point at all had been entered.

Another odd thing... well, it's actually quite useful after you get used to it... is that AutoCAD remembers the last command you gave it. In many cases one will want to do the same things multiple times. As such, hitting return on a blank command line will bring up the last command for another shot.

In placing lines on the AutoCAD worksheet there are a number of things one should bear in mind. The primary one of these is that AutoCAD plots from a list of objects... lines and circles and letters and things... rather than from a bit map. This means, for example, that if one draws a line and then draws another line over it AutoCAD will plot both lines. On most plotters this will result in the line looking darker than the other lines on the drawing.

This also means that if one draws something at one corner of the work space, moves to the other corner, draws something there and then moves back to add a third thing to the bit in the first corner the plotter will make the trip in exactly the same way.

### Panning for Gold

There are two commands which control what you see, these being ZOOM and PAN. These are the guys that will make you wish for an 8087 if you haven't got one, because every time AutoCAD changes its image it has to regenerate it, or build it up on the screen bit by bit from its list of objects. Because it can't know which objects are going to be extending into the screen for any given drawing it goes through the whole list.



# The Art of AutoCAD for the PC

A large drawing, such as the schematic for the Sloth computer in the last edition of Computing Now!, can take three or four minutes to regenerate without a co-processor.

You can cancel the regeneration at any time by hitting control break. However, this will leave you with an incomplete picture on the tube.

It's best to imagine that the screen of the PC under AutoCAD is a television camera looking down onto a piece of paper which holds your drawing. In most cases one will wind up working on a drawing which is quite large, so much so that if the camera were to be zoomed out enough to see it all there wouldn't be enough detail to allow one to work on it.

The usual way to work on large drawings is to use the ZOOM command to see the whole picture... ZOOM 1... and then move in to selected sections to work on them... perhaps ZOOM 4. You can move the screen around in a number of ways us-

ing ZOOM. You can pick a centre point and have ZOOM move in closer with it as the centre of the screen. You can also zoom a window, that is, use the cursor to describe a rectangle on the screen and have ZOOM move in as much as it has to fill the screen with the contents of the box.

The PAN command moves the virtual television camera over the work sheet without zooming in or out. The lower left hand corner is point (0,0) for AutoCAD... one PANs by specifying a Cartesian displacement from the lower left hand corner of the current screen in relation to this origin. Thus, for example, telling PAN to move (5,3) would shift the screen five units left and three down. Negative numbers would move right and up respectively.

When you put something... a line, text, a circle and so on... down on the work sheet AutoCAD regards this as an object. However, in some cases you can have multiple things in an object.

The electronic symbol for an inverter...

the triangle with a dot at its point... consists of four individual objects, that is, three lines to make the triangle and a circle. We can combine these into one object and give it a name with the BLOCK command.

The most common way to use BLOCK is to pick a bit of unused real estate on the work sheet and draw the symbol or other aardvark one wants to block off. Type BLOCK and a name for the eventual block and use the cursor to describe a window around the collection of objects. AutoCAD thereupon inhales all the objects in the window.

Having defined a block we can slap it down anywhere on the work sheet as often as it's needed. To put an inverter into a circuit diagram... check out the Sloth in Lights article elsewhere in this edition... we would type INSERT INVERTER and then use the cursor to specify where it is to go. AutoCAD offers one a lot of options when one is inserting blocks... in most cases you can just hit return to ignore them.

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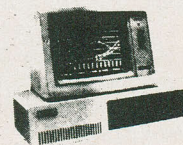
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In using blocks it's important to get some technique happening. For example, you will have to specify a "base insertion point" when you define a block, that is, the place where your cursor will be when the block is plopped onto the screen in relation to it. This can be anywhere you want... by convention I usually make it the lower left hand corner of the window that encompasses the block. If you don't keep things consistent when you define blocks you'll have a hard time knowing where they'll appear in relation to your cursor when you go to insert them.

Complex blocks take a long time to regenerate. You can redefine a block as often as you want to, and, for example, if I were to redefine the block INVERTER all the inverters in the drawing would change. This is a very useful way to avoid long regenerations.

The round dots that join lines in the Sloth circuit diagram are blocks called DOT. I created the ones that appear in the finished drawing by drawing a circle and using the HATCH command to fill it in with very closely spaced lines. These, however, take a long time to come up on the screen.

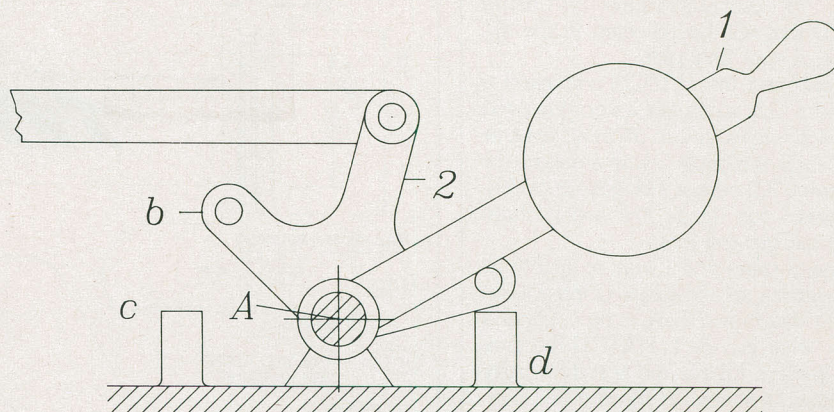
When I was actually doing the drawing I defined the block DOT as being four points around the centre point of the dot. These regenerated a lot faster, and filled in the space until I was ready to plot the picture for the last time.

Blocks can be as big as you want them to be and you can have as many as you like. However, there are a few limitations. Once it has been defined, a block is a single object. If you try to ERASE part of a block you'll take out the whole block. Unlike as in the case of simple objects, like lines, the BREAK command doesn't work with blocks. In other words, you can't edit blocks once they have been defined, only redefine the whole block.

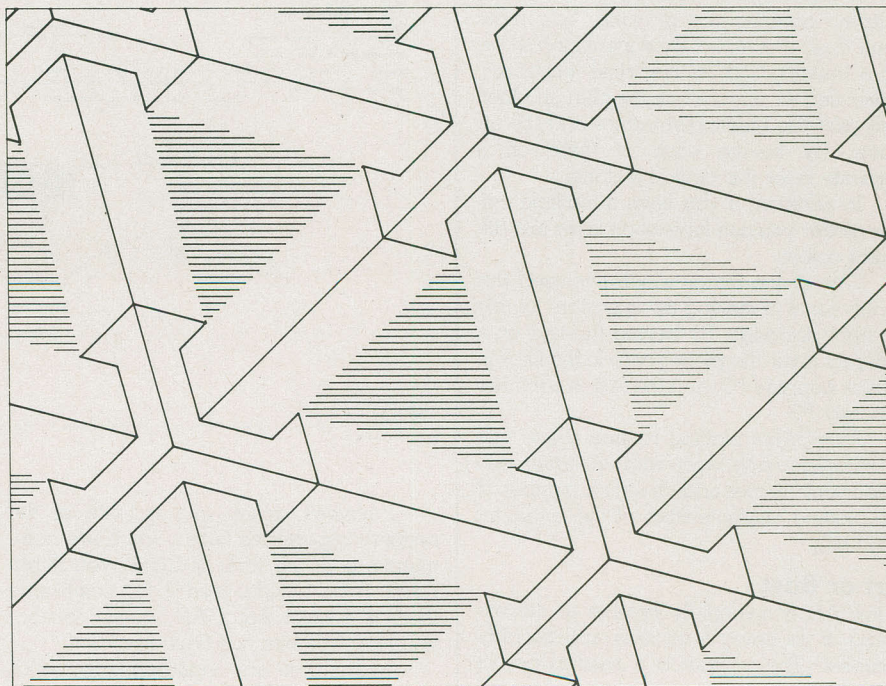
There's a really quick and nasty way of moving blocks from one drawing to another. The blocks in Sloth in Lights are the same ones I used in Sloth for the Z80. The first drawing lived in a file called Z80 and the second in one called LIGHTS. Yes, I know, it is predictable. To move the blocks I had AutoCAD inhale the file Z80, zoomed out to so that I could see the whole drawing and erased everything by drawing a window around the whole work space with the ERASE command.

I then saved this as LIGHTS. The drawing was gone but the blocks remained. The original drawing, of course, was still intact as the file Z80. Editing LIGHTS gave me access to all of the blocks I'd created in Z80.

## WEIGHTED LEVER



from "Mechanisms in Modern Engineering Design", by  
I. I. Artobolevsky,  
Volume I, p. 115



An artistic use for AutoCAD, this escher print was computer generated.



# The Art of AutoCAD for the PC

## Hatching a Plot

When you're mousing your brains out it's easy to forget that the drawing you are doing will eventually get plotted. There are a number of considerations in using AutoCAD that will be reflected in the appearance of your final plot.

I mentioned the HATCH command a minute ago. This is actually a very involved thing which allows you to fill in an area or object... such as a circle... with a pattern, or hatch. AutoCAD comes with gallons of canned patterns for things like architectural symbols and general tones.

In many cases you'll want to simply fill an area with ink, as in the case of the dots on the circuit diagrams. There is no command for this... what you do is HATCH the area with the pattern LINES and specify a fairly close spacing for them. A spacing of .05 inches worked well for me... this will vary with what you're up to and the plotter you're using. A denser hatch than you need will increase the regeneration time of your drawings and beat the stuffing out of your plotter pens.

AutoCAD allows one to CAD on multiple layers, or overlays, of a drawing. You might imagine several sheets of transparent film laid one on top of another. You can make any layer visible or invisible.

There are number of uses for this facility. It allows you, for example, to plot selected portions of a drawing. You might want to do a complex drawing which showed a building with its electrical, plumbing, sewer and air ducts all on the plan and then only plot the building structure and the air ducts. By having each of these on a separate layer this could be done.

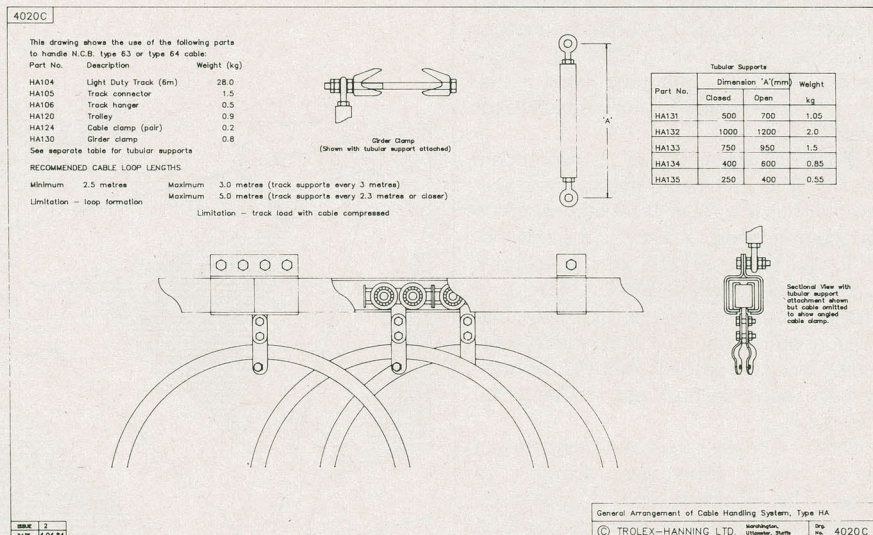
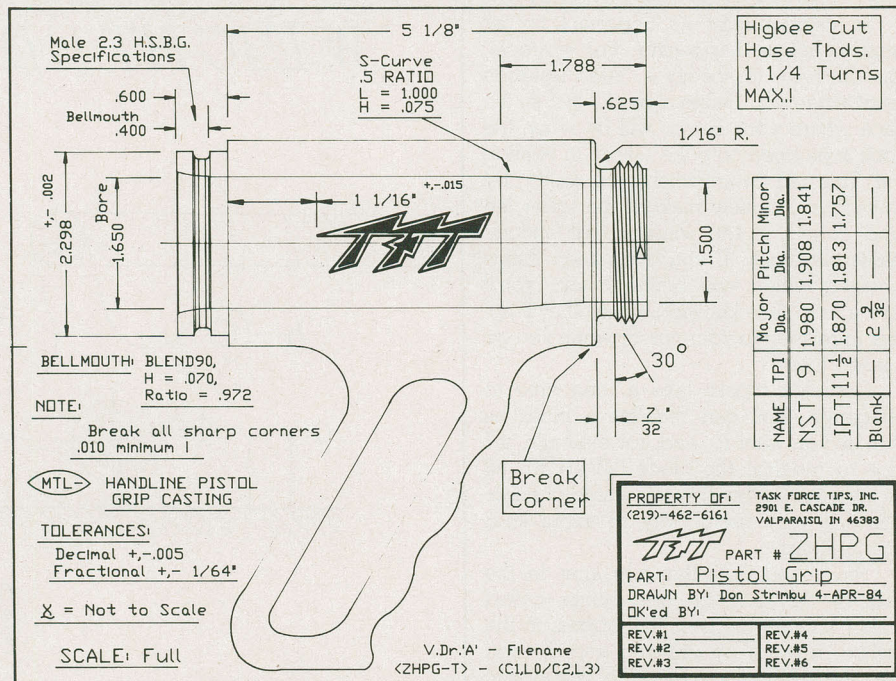
In addition, if you have a multiple colour plotter you can have each layer in a different colour.

One of the things which I've used this facility for is in making the text more legible on tight drawings. By having the text on a different layer the plotter can do the lines in a thick pen, say P7, and the text in a thinner one, say P3.

AutoCAD's plotting routine allows one to associate each layer with whatever pen colour one fancies and change a number of the plotting characteristics of the layers individually.

## Art or Bust

AutoCAD is splendidly flexible at the expense of it's being a bit slow and horribly complex. The manual is a masterwork of completeness but it's a nightmare to get through when your disks are still fresh from the shrink wrap.



I haven't gotten into a tenth of the system's capabilities here... there are commands to do all sorts of things you might need. Even having used it for some time there is a lot of AutoCAD I never touch... you learn the bits you have to.

While there are unquestionably better packages around to do certain types of drafting... smARTWORK for printed circuit boards, as checked out in the September 1984 edition of Software Now!, for exam-

ple... AutoCAD is about the most cost effective and generally powerful basic CAD system you can zap into a PC. It... and the blue '75 Chevy pickup truck full of paraphernalia you'll eventually have to add to your PC to fully support it... are by no means cheap.

They are, however, a lot more civilized than is becoming encrusted in ink while a sheet of paper takes its revenge on your pens.

CN!

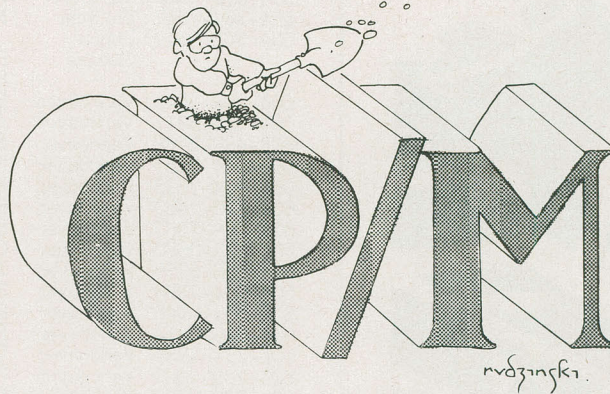


# Almost Free CP/M Hacker Software

CP/M is anything but a dead language . . . if you are into hacking code on this powerful operating system you'll know that it's one of the most flexible environments there is to develop software in. Beyond all this, of course, it's enormous fun.

We haven't lost touch with CP/M. Because there is still so much interest in developing assembly language programs for it we have brought together a collection of the latest releases of CP/M based programmer's tools from the public domain. Included here are debuggers, disk utilities and a number of other extremely powerful programs which have evolved into packages which far excel commercial programs in many cases.

Included on this disk are:



**SUPERZAP** This is a disk utility similar to the DU programs . . . the latest one of these is also included. Superzap lets to modify your disks at the track and sector level, patching code and fixing BDOS errors. However, unlike DU it's all menu driven, with a full screen editor.

**DU-V88** The DU programs have been the universally accepted disk utilities for CP/M since prehistoric times. While not overly friendly they offer every conceivable feature. Included here too is the long sought DU DOC file.

**MEMDSK32** is the best memory disk program we've ever seen for CP/M. Far from needing a week of hacking to get it going, it runs on any 64K system without patches or parameters to create a 32K RAM disk labeled drive D. The source is included should you want to alter its parameters. This makes things like ASM and MAC work like they had wings on their feet.

**ZDEBUG** is a Z80 debugger. Its function is analogous to that of DDT, but it works in Zilog mnemonics rather than those of the Intel 8080. As such, it'll handle Z80 code and not give you lines of question marks when you're trying to patch your BIOS or other commercial software.

**COPY** is a handy program for users of systems that don't have a way to copy entire disks. This will take everything . . . files and system tracks . . . and pop'em over to another floppy. The source file is provided.

**PROBE** digs through your version of CP/M and tells you everything there is to know about it, including things like the locations of its various components, where things jump to, how the disk allocation is set up and so forth. It's a splendid asset to low level programming.

**ZESOURCE** and **REZ** are the most fiendish disassemblers in creation. They will allow you to create pretty good assembler code from a COM file . . . with a bit of ingenuity you'll be able to recreate most existing software to enable you to learn its secrets and patch it for your own applications. It's especially useful for patching CP/M. Both are supplied to allow you to use either simple assemblers or M80 and L80.

**ASM65** is a 6502 cross assembler. It runs under CP/M but it assembles 6502 source code. It's extremely useful for developing sophisticated Apple software, of course, and for doing EPROMs for 6502 based systems. In fact, it supports the entire range of 6500 series processors.

**MLOAD24** is a replacement for the LOAD command . . . with considerably more power behind it. It is ideal for doing loads that call for merging in overlays, multiple hex files and so on.

All of the above software is supplied with appropriate documentation in the form of DOC files. It is the software we use to create and modify CP/M programs. All of it is in the public domain.

This collection is available for

**\$22.95**

plus 7% Ontario provincial sales tax

(this is two single sided disks or one double sided disk, as needed. It is available for Apple CP/M, eight inch SSSD format and all of the five and a quarter inch formats listed in the Almost Free software section elsewhere in this magazine.)

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**Fine Print:** All of this software was obtained from public bulletin boards and is believed to be in the public domain. Our charge defers the cost of collecting, testing and assembling this collection, plus the cost of the media and its shipping and handling. We are not charging for the software itself.

We have done our best to ascertain that this software does what it says it does. We are not however, able to assist you in adapting it for your application.



# Adventures of All the BBS Numbers in the World



by Brian Greiner

**F**rom the depths of the dreaded Frobisher Bay swamps to the frozen wastelands of Vancouver, from the oil sodden shores of the Maritimes to the mental wastelands of Ottawa I searched. Dodging vicious shrieking modems and grappling with rabid trunk lines I scoured the nation.

The object of my search was, of course, the Lost Ark of the Bulletin Board. Rumored to have strange and wondrous powers, it has been lost for to these many moons. Although I have not yet found the Ark of Power, my search has not been in vain. Enclosed below is a log detailing my journey. Perhaps you will continue the quest, perhaps you will be the one to find the Lost Ark of the Bulletin Board.

There are two hundred and five oases shown on this map, of which I actually visited one hundred and seventy-eight. This list is as complete as my rapidly dying body could make it, and is complete as of June. May the odd gods go with you.

By the way, anyone with a board they'd like to have on the list is welcome to contact me at the Full Moon. It's under the Ontario listing.

\*except those outside Canada

## British Columbia

604-376-0930	Kamloops	Provider	24 hours
604-764-7047	Kelowna	Micromessage	5 pm to 8 am
604-562-9519	Prince George	Prince George RCP/M	5 pm to 8 am
604-272-2549	Vancouver	Startraders	24 hours
604-325-3811	Vancouver	A.K.A.T.	24 hours
604-438-2468	Vancouver	SATYRICON CBBS	24 hours
604-464-5261	Vancouver	RBBS Canada	24 hours
604-464-7693	Vancouver	RBBS POCO	24 hours
604-520-1470	Vancouver	DataLine	24 hours
604-584-2583	Vancouver	Surrey CP/M	24 hours
604-585-0680	Vancouver	Color-80	24 hours
604-588-3255	Vancouver	Sprite Computer	6:30 pm to 9 am
604-594-7398	Vancouver	Fast80	9 pm to 9 am
604-596-0146	Vancouver	Basic'ly	24 hours
604-596-0314	Vancouver	FOG #2	24 hours
604-731-2724	Vancouver	The Twilight Zone	24 hours
604-733-1000	Vancouver	Philosophy BBS	24 hours
604-738-2773	Vancouver	Fast-80	24 hours
604-738-7811	Vancouver	Turbo BBS	24 hours
604-926-8192	Vancouver	Blue Hell	24 hours
604-937-0906	Vancouver	Frog Hollow	24 hours
604-939-1749	Coquitlam	The 64 Station	24 hours
604-946-0955	Vancouver	TVG	24 hours
604-381-2143	Victoria	IBMPCUG	6 pm to 8 am
604-384-7607	Victoria	Provider	24 hours
604-478-2234	Victoria	DataWest	24 hours
604-478-6710	Victoria	Granny's II	24 hours
604-479-6028	Victoria	Starship	24 hours
604-721-2726	Victoria	Computertek	6 pm to 10 am

## Alberta

403-245-2724	Calgary	Excalibur	24 hours
403-246-8064	Calgary	Apple Jacks	24 hours
403-248-3444	Calgary	Hot Line	24 hours
403-252-3149	Calgary	Haysboro RCP/M	24 hours
403-287-3638	Calgary	Computer Shop BBS	5 pm to 8:30 am
403-288-1601	Calgary	Dimensions	24 hours
403-639-2400	Cold Lake	AADAC	4 pm to 8 am
403-426-0352	Edmonton	Bruce's BBS	24 hours
403-434-3597	Edmonton	Party Line	24 hours
403-435-3321	Edmonton	Round Table	24 hours
403-437-4793	Edmonton	Camelot II	24 hours
403-454-6093	Edmonton	Edmonton RCP/M	24 hours
403-461-2960	Edmonton	WCDC	24 hours
403-463-5774	Edmonton	South Side PC	24 hours
403-464-4059	Edmonton	Smorgasboard	24 hours
403-464-4172	Edmonton	Antithesystem	24 hours
403-466-7656	Edmonton	Bob's BBS	9 pm to 6 am
403-471-2827	Edmonton	Westworld	24 hours
403-474-0147	Edmonton	Net-Works	24 hours
		North Alberta	24 hours
		COCO	24 hours
403-481-2596	Edmonton	Crossroad	24 hours
403-484-5981	Edmonton	Meadowlark RCP/M	24 hours
403-486-0651	Edmonton	ENUG	24 hours
403-489-1603	Leduc	NAPCUG	24 hours
403-320-6923	Lethbridge	Looking Glass	24 hours
403-526-6408	Medicine Hat	Hatcom	24 hours
403-347-3482	Red Deer	Town Crier	6 pm to 8 am

## Saskatchewan

306-922-3238	Prince Albert	Aurora	4 pm to midnight
306-347-4493	Regina	Fido	5 pm to 7 am
306-522-6092	Regina	Middle Earth	24 hours
306-525-3973	Regina	Sask-Ed-Net	24 hours
306-584-0748	Regina	Micro City	9 am to midnight
306-586-0904	Regina	Milliway's	24 hours
306-586-1869	Regina	Alnwick	24 hours
306-586-5585	Regina	EMIS	24 hours
306-789-4380	Regina	Ascii Express	9 pm to noon
306-789-7883	Regina	Phoenix	24 hours
306-949-4699	Regina	Dungeon	9 pm to 5 pm
306-242-3134	Saskatoon	SPCUG	6 pm to 8 am
306-242-3821	Saskatoon	The Way	24 hours
306-374-2391	Saskatoon	Color80	24 hours



306-384-2844	Saskatoon	STICC	24 hours
306-384-6301	Saskatoon	SCCC	24 hours
306-384-8040	Saskatoon	Mustang	24 hours
306-665-7085	Saskatoon	Gravestone	24 hours

#### Manitoba

204-785-8742	Selkirk	MMS BBS	24 hours
204-774-8863	Winnipeg	RCP/M II	24 hours
204-942-1109	Winnipeg	VE4 Micro BBS	24 hours
204-943-9007	Winnipeg	RCP/M I	24 hours

#### Ontario

519-853-1063	Acton	PSOC	24 hours
705-726-4897	Barrie	BUG	24 hours
705-728-4125	Barrie	Megasoft	24 hours
705-737-1599	Barrie	Computerland	6 pm to 8 am
705-456-6026	Barrie	Almost Heaven	
416-454-3046	Brampton	Info-Tek	24 hours
416-632-3572	Burlington	PCS	24 hours
416-632-5653	Burlington	TFC	
519-853-1063	Chatham	Pit Stop	24 hours
416-877-0280	Georgetown	Amex	24 hours
519-821-2163	Guelph	Dreamworld II	24 hours
519-821-5701	Guelph	Beacon	5:30 pm to 8:30 am
519-821-5702	Guelph	Starfleet	24 hours
519-822-7832	Guelph	EMJ	24 hours
519-824-9234	Guelph	Dungeon	
416-549-7895	Hamilton	CompuAd	24 hours
519-471-3914	London	LATCH	24 hours
416-844-2483	Oakville	OTB	24 hours
416-576-3213	Oshawa	CIBB	6:30 pm to 8 am
416-433-0804	Oshawa	Computerland	6 pm to 10 am
416-723-2430	Oshawa	Garfield	24 hours
613-230-7154	Ottawa	Fido	24 hours
613-234-9678	Ottawa	ORCS	24 hours
613-236-1145	Ottawa	Alleycat	24 hours
613-523-1614	Ottawa	O.B.E.	24 hours
613-526-0062	Ottawa	Micro-Tech	24 hours
613-592-0240	Ottawa	Edu-Tot	24 hours
613-722-7949	Ottawa	User Port	24 hours
613-725-2312	Ottawa	Home Computing Club	24 hours
613-725-9295	Ottawa	Conference Centre	24 hours
613-727-0575	Ottawa	Modem World	24 hours
613-731-3419	Ottawa	OMX	24 hours
613-731-4322	Ottawa	HamOp	24 hours
613-738-0617	Ottawa	TI-99/4 UG	24 hours
613-748-1035	Ottawa	E.T. Wilson	24 hours
613-820-0010	Ottawa	TBC-3	24 hours
613-820-4646	Ottawa	TBC-1	24 hours
613-820-4669	Ottawa	TBC-2	24 hours
613-829-6641	Ottawa	NCAUG	24 hours
613-830-2823	Ottawa	OMFS	24 hours
416-877-3079	Peel	HPCC	24 hours
416-683-7666	Pickering	Superboard	24 hours
807-622-2685	Thunder Bay	TBBS/TB	24 hours
416-226-9260	Toronto	Toronto Fidonet	24 hours
416-231-0538	Toronto	Toronto RCP/M PC	24 hours
416-232-0442	Toronto	Toronto RCP/M	
416-232-0442	Toronto	CP/M	24 hours
		CP/M	24 hours
416-232-1470	Toronto	Toronto RCP/M BBS	24 hours
416-239-5972	Toronto	MirkwoodT	24 hours
416-239-5993	Toronto	Appleby	midnight to 9 am
416-241-1659	Toronto	Compu-Shop	6 pm to 9 am
416-241-4513	Toronto	Night Hawk	24 hours
416-243-1866	Toronto	Orient Express	
416-274-2387	Toronto	Milliway's	
416-277-9991	Toronto	BBBBS 4	24 hours
416-294-9734	Toronto	Sports BBS	
416-366-2069	Toronto	CFTR BBS	24 hours
416-423-5149	Toronto	ETV/CN BULL	6 pm to 9 am
416-439-0065	Toronto	Games BBS	7 pm to 7 am
416-445-3083	Toronto	Phobos II	9 pm to 8 am
416-445-5192	Toronto	PMS LOGIC	24 hours
416-445-6696	Toronto	ProNet I	24 hours
416-463-5411	Toronto	Unix Pipeline	24 hours
416-481-8661	Toronto	BBBBS 2	24 hours

416-481-9047	Toronto	BBBBS 3	24 hours
416-484-2726	Toronto	M\$WBBS	24 hours
416-485-9245	Toronto	Castaways	24 hours
416-487-5833	Toronto	BBBBS I	24 hours
416-488-9718	Toronto	Trash Can	
416-494-8046	Toronto	Vanguard	24 hours
416-530-4606	Toronto	Jim's BBS	24 hours
416-536-5843	Toronto	Micro/Access	24 hours
416-592-9705	Toronto	Alien World	24 hours
416-593-7460	Toronto	Arkon InfoSys	24 hours
416-594-0155	Toronto	Artworks	24 hours
416-598-1934	Toronto	Boards Galore	24 hours
416-621-3858	Toronto	?File Not Found	24 hours
416-624-9615	Toronto	Softworx	24 hours
416-630-4737	Toronto	Full Moon	24 hours
416-640-3434	Toronto	TBBS	24 hours
416-652-3480	Toronto	True North	
416-653-2248	Toronto	Dragon Den	24 hours
416-673-0557	Toronto	SGV	24 hours
416-675-3214	Toronto	INFO-80	24 hours
416-683-3733	Toronto	ProNet II	24 hours
416-698-7994	Toronto	Temple of Doom	7 am to 11 pm
416-731-4797	Toronto	Jail	24 hours
416-742-9190	Toronto	Bell&Howell	
416-743-6221	Toronto	CoCo Nut	24 hours
416-751-6337	Toronto	PCanada	24 hours
416-782-9534	Toronto	TPUG	24 hours
416-783-6984	Toronto	IAFYF	24 hours
416-823-4521	Toronto	Colour Dragon 2	24 hours
416-844-6587	Toronto	Satellite	24 hours
416-896-1265	Toronto	DISK I	24 hours
416-896-1446	Toronto	PSI Wordpro	6 pm to 9 am
416-964-6886	Toronto	Buy&Sell	24 hours
416-964-7665	Toronto	Pool	24 hours
519-653-7620	Waterloo	KWACK	24 hours
519-653-8910	Waterloo	Desktop	
519-894-2634	Waterloo	TRS80	8 pm to 8 am
416-666-4151	Whitby	Playboard	9 pm to 8 am
416-668-2078	Whitby	Red Baron	24 hours
416-668-4608	Whitby	Whitby Data	24 hours

#### Quebec

514-365-9914	Montreal	Connection	
514-366-0795	Montreal	Task Force	
514-392-8411	Montreal	T50	
514-481-6371	Montreal	Stonehenge	
514-487-2792	Montreal	Microdial	
514-598-9093	Montreal	Babilog	24 hours
514-683-5013	Montreal	Blackhole	24 hours
514-684-5464	Montreal	Cache	
514-684-7101	Montreal	Cache II	24 hours
514-697-1279	Montreal	Kurtz's Compound	24 hours
514-697-9947	Montreal	Atari	6 pm to 11 pm
514-932-9110	Montreal	Treasure Island	
514-933-4200	Montreal	Computerland	9 pm to 8 am
514-937-6249	Montreal	USS BBS	

#### Nova Scotia

902-434-3121	Dartmouth	TIBBS	
902-434-5278	Halifax	Rainboard	9:30 pm to 8 am
902-435-1495	Halifax	Wee Computer	24 hours
902-455-5123	Halifax	Softwerx	6 pm to 8 am
902-465-2865	Halifax	CUBBS	24 hours
902-683-2086	Halifax	Great White North	
902-857-9843	Halifax	Hubbards	24 hours

#### New Brunswick

506-453-8119	Fredericton	Educom	
506-457-0876	Fredericton	Blackboard II	8 pm to 8 am
506-472-3709	Fredericton	Educom	
506-357-9660	Oromocto	Info-pack	
506-652-6007	St. John	Computer World	
506-693-2823	St. John	Infoquick	

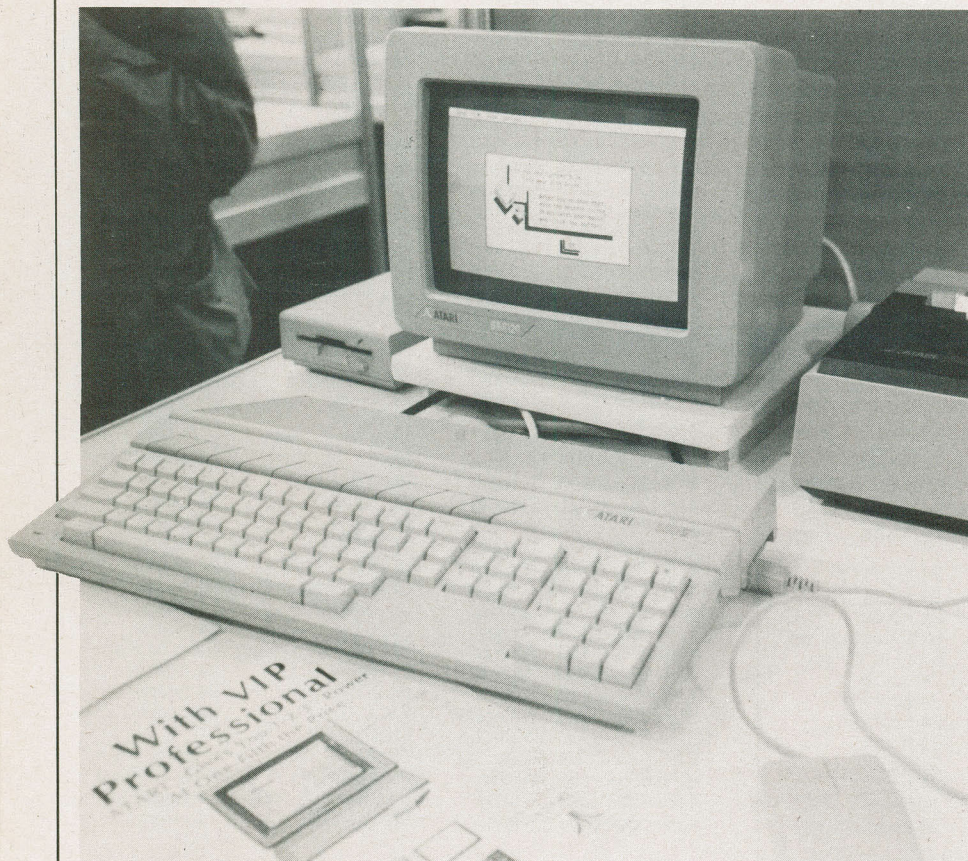
#### Northwest Territories

819-979-6702	Frobisher Bay Nunatsiakmiut		6 pm to 9 am
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CNI



# New Computers from Atari and Commodore



**Long resting on their laurels... a most uncomfortable position... Commodore and Atari have both released some new toys. Some, such as the fabled 520ST, promise to lay some heavy competition on the established industry.**

**by Frank Lenk**

One thinks of Commodore and Atari as being manufacturers of personal computers, machines that either appeal to the low end of the market or to esoteric needs and applications. One would not have classed either of them as being contenders for the spaces occupied by Apple and IBM. Well, perhaps not right now...

Both of these former back benchers seem to have developed some teeth.

The pointy end of this new presence has been embodied in two new lines of home

and business computers. These machines are aimed at markets devoted to exclusive users of the traditional high end systems. One look at the new Atari and Commodore computers is enough to foretell a deadly conflict to come.

## Once Upon a Time

Jack Tramiel built Commodore up from a very small Toronto typewriter outlet into a billion dollar Bahamian corporation. A hard headed businessman, Tramiel produced a series of computers that were cheaply built and attractively priced. His greatest triumph was the incredibly cheap, vastly over-advertised and immensely popular Commodore 64.

Atari, on the other hand, has always been the shrinking violet of the computer industry. Several years ago the company came out with a technologically advanced, solidly built home computer... and then allowed it to languish and almost fade away for lack of even a half hearted marketing push. While Commodore was cleaning up with the 64, Atari's arguably superior 800 remained the secret of a tight knit network of admirers.

Meanwhile, Jack Tramiel was having increasing trouble with the new 'big business' attitude at Commodore. He decided it was time to make a fresh start, doing what he did best, running a small, 'family' company. Warner Communications, by this point seeking to slough off the sickly Atari operation, virtually gave it away to Tramiel, actually lending him the cash to buy the company.

When all the dust began to settle, what emerged was a total swap of personalities. The new Commodore became a conventional corporate event. Atari turned out much more like the old Commodore, lean and fast on its feet. The two companies released their new 'spring lines' almost simultaneously, and these machines definitely reflect the exchange of polarities. Both companies threw press gatherings to inaugurate the new age. Even the type of catering showed some drastic differences.

## A Commodore Odyssey

Commodore's presentation was introduced by local weatherman and all round media mouthpiece Dave Duvall. Dave expounded at great length upon a rather confusing meteorological metaphor that was apparently meant to demonstrate graphically that Commodore's 'high pressure area'... or perhaps big wind... was going to blow away competitors such as Apple and IBM.

This extensive blast of hot air was followed by an immensely overproduced three screen, eighteen projector, twenty thousand dollar slide show extravaganza, which went on for quite some time about how wonderful Canada is and how overflowing this "big country" is with "big people" such as Anne Murray, Ken Taylor, Terry Fox, Wayne Gretzky and Spar Aerospace. What all this had to do with the price silicon was somehow never quite explained.

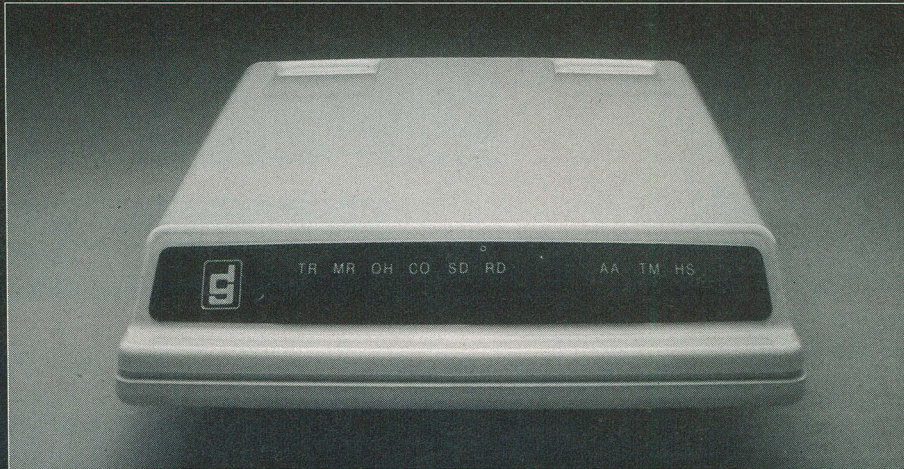
At last the press was introduced to Alfred T. Duncan, the president and general manager of Commodore Business Machines Limited. Duncan seemed very pleased with the company's "strong new management", its installation of new technology in Silicon Valley and its acquisition of a "world class graphics and chip design" from Amiga. Duncan also pointed out that Commodore's 1984 Canadian unit sales were just about double those of its nearest competitor... IBM.

By way of introducing the new Commodore computers, Duncan added that the company had "learned that consumers are willing to pay more to get more..."

Introducing the machines themselves was Richard McIntyre, the vice president in



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2. Accuracy!
3. Accuracy!

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# New Computers from Atari and Commodore

charge of sales. He spoke first of the PC10, Commodore's plunge into the world of MS-DOS. Although McIntyre stressed that this was "more than just a clone", there's no getting away from it... the PC10 really is yet another PC clone.

However, it looks like a good one. For about three thousand dollars one can have 256 kilobytes of RAM, a monochrome display card, a monochrome monitor, two disk drives, serial and parallel interfaces, DOS 2.11, GWBASIC and four empty slots on the motherboard. The integral disk controller can handle up to four floppy drives and can support up to two hard drives with a capacity of up to seventy megabytes per drive. A colour display card should be along this summer, although existing third party cards should work.

Some parts of the PC10 will look strangely familiar. The keyboard is by Cherry, with a reasonable feel and an excellent typewriter layout. The floppy drives are from BASF, and feature rather strange little buttons rather than the usual levers.

The ROM BIOS was originally acquired from the departing Hyperion computers, but it has been considerably modified to improve on the Hyperion's rather dubious IBM compatibility. In fact, booting the PC10 brings the somewhat familiar 'Phoenix BIOS' greeting. Considering that Phoenix is probably the most popular third party clone BIOS going, the PC10 should not have any compatibility problems.

There were various PC10s scattered around at the press conference. These



seemed to run stock software such as Borland's Sidekick with no hassles. The PC10 is being built in Europe, and over five thousand systems have sold there since February.

Commodore's other new effort is more remarkable. The Commodore 128 combines several desirable features into a single box. The machine works in three modes; a C 64 mode, a C 128 mode and a CP/M 3.0 mode.

In its C 64 mode the 128 effectively is a Commodore 64, giving it access to a large and growing base of software. The 128 mode is the next step up, accessing from

128 kilobytes to 512 kilobytes of memory, with forty or eighty columns in sixteen colors on a twenty-five line display. The firmware, BASIC 7.0, supports multicolor sprites and similar other goodies.

The CP/M mode also allows for RAM from 128K to 512K and accesses the same display options as the 128 mode.

The basic system costs about five hundred and fifty dollars Canadian. Add a colour monitor and a disk drive and it's up at just under sixteen hundred dollars. By comparison the latest price for the Commodore 64... which, by the way, will not be discontinued for "at least three years"... is about two hundred and fifty dollars.

To go with the 128 Commodore has also introduced a new disk drive, the 1571. This can emulate the older 1541 and 2031 drives, but can access up to 350 kilobytes under Commodore 64 control or up to 410 kilobytes under CP/M control. The data transfer rate is much higher than with the older drives, running at up to fifty-two hundred characters per second under either C 128 or CP/M. Standard CP/M disk formats, such as those of the Kaypro and Osborne, can be accessed.

As with Apple's 128K //c and //e, the use of that extra RAM in the 128 is somewhat nebulous. There is considerable talk of RAM disks in the short term, although bank switching software will no doubt appear for it. For now, Commodore will be selling Arktronics' Jane 2.0 integrated software to go with the C 128 system, and the Perfect Writer, Calc and Filer programs for the CP/M side.

The C 128 presents an intriguing prospect in a couple of ways. Firstly, it should





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# New Computers from Atari and Commodore

do considerable damage to the overpriced Apple II series, especially in Canada where Commodore already lays claim to sixty percent of the educational market. The 128 is also notable in being exactly the machine that one would have expected to see on the market a year or two ago, when CP/M was hot stuff and Apple was the company to beat. Ah well... such are the mysterious ways of the corporate minds that decide these things.

## To The Arcades

It was worth noting Commodore's multi media presentation if only because of the drastic contrast with Atari's approach. Atari showed up without rear projection movie screens and media celebrities. Instead, it had Jack Tramiel.

We've been hearing an awful lot lately about Jack Tramiel and his 'Jackintosh'. Whether or not the computer lives up to its promise, Jack Tramiel certainly does. Short, bald, and armed with a big cigar, Tramiel looks and acts like someone out of a 'B' movie.

When he took the podium, Tramiel spoke without 'visual aids', and without notes. He was introduced by his second in command, Jaimie Copeland, who looks and acts like a Woody Allen parody of a California businessman, complete with gold chains and a heavy tan.

Copeland summarized the corporate approach. Ten months ago Atari employed over two thousand people. Now it employs about two hundred. It originally was unable to cope with the flow of about six thousand calls and five thousand letters daily for customer support. Copeland's solution was to distribute this influx among all the employees in the company, to give them a better understanding of the realities of the business. As Copeland put it, "We are the new Atari... feet firmly planted on the ground."

"This is not a market for dreamers," he added.

Tramiel explained his departure from Commodore as having resulted from a disagreement with the company's chairman.

"I don't understand why big is beautiful," he said. He prefers to run his company "like a family business", and make his employees feel a part of what they're doing. He claims to have manufactured more than his share of millionaires at Commodore, and a lot of those people have... understandably... come with him to Atari.

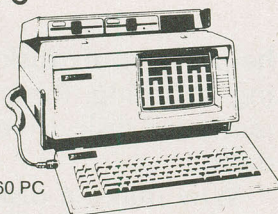
As Tramiel sees it there are two computer markets, one serving those who don't spend their own money, the other serving those who do. The latter market demands value for the money it spends, and this is his preferred niche.

Remembering his Canadian roots, Tramiel said he would introduce his Atari 520ST... the 'Jackintosh'... in Canada first. The very first machine was presented at the conference to Murray Maracle, a representative from the Tyendinaga Indian Reservation, for use partly in the development of an Indian language type font.

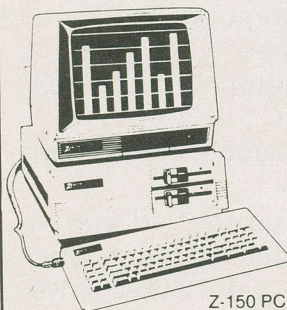
It's hard to say anything about the ST itself that hasn't already been hinted and rumoured for months. The machine has 512

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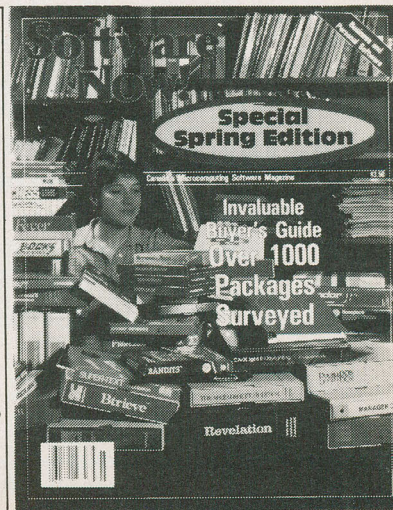
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Seated with a 520ST, Jack Tramiel defies criticism.

kilobytes of memory and operates under Digital Research's GEM environment. It features icons, drop down menus, mice and all the other trappings popularized by Apple's Macintosh. The big innovation is the price. It will sell for about fourteen hundred dollars Canadian, including one three and a half inch floppy drive and a high resolution monochrome monitor. Of course, the ST also does colour, something the Mac distinctly lacks. However, a colour tube is optional. So also is a fifteen megabyte hard disk, which should go for about five hundred dollars American.

What the ST lacks, at least for now, is software. When asked, Tramiel unhesitatingly stated that there is "definitely going to be a shortage of software before June one." However, a great number of packages seem to be on the way, primarily from established Macintosh software developers.

One might well ask how such a machine can be built so cheaply. Tramiel claims that the trick is knowing the business. However, a cursory examination of the ST reveals some of the corners that have necessarily been cut. Although the ST has that bone white, professional look, the mechanical workings feel more like those of the Commodore 64 than of the Macintosh. The keyboard is well laid out, but running a finger over the keys produces a faint sound reminiscent of rusty bedsprings. One also wonders how the ST came by function keys that are... would you believe... parallelogram shaped.

Overall the machine seems usable, but it's certainly lacking the substantial feel of the impeccably sculpted Macintosh box. Considering the price differential, it's a pretty fair trade. Still, it seems a shame that for an extra hundred bucks or so you couldn't get a more sophisticated package.

The first shipment of STs was due to arrive in Canada before the end of May. The machine will sell only through accredited dealers. A completely restyled version will be available through chain stores and other outlets, but this edition will be considerably degraded... in non-essentials, at least... presumably in order to avoid undue competition with the specialty dealers.

The ST will essentially remain non-expandable. If memory or other features are to change, they will do so in complete new models rather than as add-ons.

Public attention has focussed on the ST, and all but neglected the new Atari XE eight bit machines already on sale. Considering the amount of cash the company has riding on the ST, however, it isn't too surprising that the XE has not turned out to be an overwhelming revolution in micro hardware. The 130XE is fully compatible with existing XL software, contains 128 kilobytes of RAM, and sells for about two hundred and seventy dollars Canadian. It offers the same broad selection of graphics modes as the earlier Atari XL series, but little real innovation of its own.

An eighty column display for the XE is rumored, as is a quarter megabyte version.

However, Atari is not going to be able to compete with Commodore as to CP/M capability. Nor is Atari's low density, low speed 1050 disk drive going to be a match for the Commodore 1571 drive. Thus the XEs seem to be rolling mostly on inertia at this point.

## Round Two

The battle for the low cost micro market is just beginning to heat up.

Jack Tramiel definitely has some more surprises up his sleeve. By this fall he intends to be marketing something called a CD ROM... a five hundred megabyte read only laserdisk. The first application will probably be for storage of archival information. For consumers, that could mean a disk based encyclopedia within the next year or so.

Tramiel was more reticent about his rumored new thirty-two bit 32032 based machine. His "immediate need and direction is on the ST", but he's still hoping to bring the more powerful computer out by late this year or early in 1986. This will not be another system for individual home users, but rather for small scale business CAD applications.

Commodore is being cagier, but mentions that it will be introducing two further "high performance systems products before the end of the calendar year." One of these is bound to be the graphics computer acquired from Amiga. This and Atari's promised thirty-two bit beast should keep things hopping in the business market while the Commodore 128 and the 520ST heat up the action at the lower end of the price range.

Just when you thought it was safe to take out your VISA card again... **CNI**

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See page 53



# PROM Night For Apple CP/M



Being able to blast EPROMs from Apple CP/M can turn one's fruit into a powerful firmware development tool. Here's a look at a simple driver.

by Steve Rimmer



**L**ow level computer hacking eventually drags one into the seething morass of EPROMs. Unlike as in the case of floppy disks and RAM, however, EPROMs are unforgiving and mute. They store information... sometimes... but they are fraught with their own peculiarities and weirdnesses.

However, unlike the PROMs of a few years ago, EPROMs can usually be erased after you've made a mess of one. The things one needs to program EPROMs are commonly found and with a bit of work can be made pretty slick.

One of the computers which is just seething with available EPROM blasters is the venerable Apple II+ and all the clones at sea. Perhaps because it makes a reasonably good platform upon which to generate the code one might want to burn into an EPROM... or, more than likely because people make a lot of illegal copies of its firmware... there is no shortage of plug in cards to blast the popular chips.

Sadly... at least for those heads not enamored of the vagaries of DOS and the 6502... none of these cards that I know of come with drivers which run under CP/M. As such, while one can easily develop PROMmable code using the armada of existing CP/M based 8080 and Z80 assemblers and cross assemblers there is no convenient way to blast the resulting object code into chips. If you are toodling with firmware this is a drag.

The program accompanying this article is, of course, a solution to all of this... there would hardly have been much point to all this preamble if it hadn't. It drives the Multiflex EPROM blaster from CP/M handling a number of popular PROMs.

## The Latch

This program is a fairly quick and nasty solution to the problem of driving the Multiflex card under CP/M... this is a verbose form of the word "inelegant". It accepts files as its input and blasts a whole EPROM with whatever it gets. Unlike as in the case of many DOS drivers, it doesn't allow one to blast part of a PROM.

However, it does allow one to examine chips directly, producing a hex dump of whatever is plugged into the card. It will also read the contents of a chip into a file for later inquisition with DDT.

Of the available low cost EPROM programmers, the Multiflex card has the advantages of being easy to find... it's sold by Exceltronix, the dweller of the inside front cover... not outrageously expensive, capable of blasting the most useful chips without a lot of hacking and fairly reliable. Of the four or five specimens I've acquired over the years, all have worked more or less well if they were properly cuddled.

The trade off for this, of course, is that the Multiflex card uses a really weird design. It's based on the 8251 serial port chip... something which is rarely associated with 6502's. This takes quite a lot of software dancing to make it come together.

In addition to this, it uses a moderately inconvenient arrangement of DIP headers and jumpers to tell the card which sort of EPROM to expect. It can get a bit unpredictable... and in the case of one permutation, destructive... if the header and the EPROM don't match.

The software to drive this monster isn't really all that involved. In fact, it really consists of a number of pretty simple functional blocks which we have encountered in earlier editions of Computing Now!

The most complex part of the whole works is actually the disk handling. The driver has to be able to read and write files and, in turn, it has to be able to parse file names.

File names are a bit tricky because they can be of varying lengths and with or without disk specifiers. BASIC could take

care of a file name in two lines... it's rather more involved in the grotty world of machine language, however.

The code to acquire and parse a file name lives in the routines at GETNAME. It uses a BDOS call to get a name into the CONBUF buffer at the end of the program and creates a file control block at 005CH... a bit of real estate dear to heart of CP/M as the obvious place to put such things.

Having successfully opened a file there are two ways to read it into memory. CP/M moves data to and from a file through what it calls its DMA buffer. The DMA buffer consists of a hundred and twenty-eight bytes at whatever location in memory we decide we want it. There's a BDOS call to move it. If one doesn't specify where one wants the DMA buffer to be CP/M will make it default to 0080H, or one hundred and twenty-eight bytes below the start of the program space.

If one tells the BDOS to read from a file one logical sector will turn up in the DMA buffer. As such, one could read a file into RAM by simply calling the read function and copying the contents of the DMA buffer into higher memory after each shot. However, a much simpler way is to start the read with the DMA buffer sitting at the bottom of the buffer that will hold the file we want to read in and then increment it by a hundred and twenty-eight bytes after each read. In this way the BDOS will put the file into memory for us with a minimum of string manipulation.

A file that's already in memory, that is, one which has been copied there from an EPROM, can be written to a disk file in the same way.

This driver is a bit brutal with disk files, by the way. If you tell it to write to an existing file it will erase the old version without any warning. Beware.

```
;
; EPROM Blaster for Apple CP/M
; Drives the Exceltronix EPROM card
; Doesn't support an Apparatus... don't
; even try one.
;
; Copyright (c) 1984, 1985 Steve Rimmer
;
; Not for use by government agencies making
; firmware for computerized toe picks.
;
; NOTE: This software may not be distributed in
; whole or in part in any machine readable form
; (source or object) without the author's written
; permission.
;
BDOS EQU 0005H
CR EQU 13
LF EQU 10
EL EQU '$'
BEL EQU 'G'-40H
TAB EQU 'I'-40H
EOF EQU 'Z'-40H
HM EQU 30
BS EQU 'H'-40H
BEL EQU 'G'-40H
SPEED EQU 2 ;SYSTEM SPEED IN MHZ
TKILL EQU 500*SPEED ;TIME TO WAIT FOR EPROM PULSE
SLOT EQU 5 ;SLOT NUMBER FOR BLASTER
ACONTR EQU 0E081H + (SLOT*16)
BCONTR EQU 0E083H + (SLOT*16)
ADATA EQU 0E080H + (SLOT*16)
BDATA EQU 0E082H + (SLOT*16)
PROMBUF EQU 04000H ;PLACE TO STASH PROM DATA
FCB EQU 005CH ;FILE CONTROL BLOCK
;
ORG 0100H
LXI H,0 ! DAD SP ! SHLD STACK ! LXI SP,STACK
CALL CLS ;CLEAR TUBE
CALL ILPT
DB HM,LF,LF,LF,LF,TAB,TAB
DB ' E P R O M B L A S T E R ',CR,LF,TAB,TAB
DB ' ',CR,LF,LF,LF,TAB,TAB
DB ' Copyright 1984, 1985 (c) Steve Rimmer ',CR,LF,TAB,TAB
DB ' Supports Exceltronix EPROM Card ',CR,LF,TAB,TAB
DB ' For the Apple II+ in slot ',SLOT,'0',',',CR,LF,TAB,TAB
DB ' ',0
CALL INIT ;SET UP CARD
CALL DEVICE ;SEE WHAT CHIP WE HAVE
CALL MENU ;DO A FUNCTION
QUIT CALL CLS ! LHLD STACK ! SPHL ! JMP 0000H
;
+++ SUBMARINES +++
MENU: CALL ILPT
```



# PROM Night For Apple CP/M

```

MENUMS DB CR,LF,TAB,TAB,TAB
        ' Main Menu','CR,LF,LF,TAB,TAB
DB ' 1. Read EPROM into a disk file.','CR,LF,TAB,TAB
DB ' 2. Write disk file into EPROM.','CR,LF,TAB,TAB
DB ' 3. See if EPROM is blank.','CR,LF,TAB,TAB
DB ' 4. Hex dump EPROM.','CR,LF,TAB,TAB
DB ' 5. Hex dump disk file.','CR,LF,TAB,TAB
DB ' 6. Quit.','CR,LF,LF,TAB,TAB
DB ' What will it be? ',0
MENU1 MVI C,1 ! CALL BDOS ! CPI '6' ! RZ ;IF 6, QUIT to CP/M
CPI '5' ! JZ HEXDISK ;LOAD DISK FILE AND HEX DUMP
CPI '4' ! JZ HEXPRM ;HEX DUMP PROM
CPI '3' ! JZ BLANK ;SEE IF EPROM IS BLANK
CPI '2' ! JZ WRITPRM ;WRITE FILE INTO EPROM
CPI '1' ! JZ READPRM ;GET PROM TO DISK
CALL RUB ! JMP MENU1 ;BAD OPTION
;
HEXDISK CALL CLS
CALL ILPRT
DB CR,LF,TAB,TAB,TAB,[' Hex dump disk file ']
DB CR,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF
DB LF,LF,LF,LF,LF,LF,LF,LF,LF,TAB,TAB,TAB
DB 'File name to read from: ',0
CALL GETNAME ! CPI 0 ! JZ BADFL ;BAD FILE NAME... ABORT
CALL CLS ! CALL ILPRT
DB TAB,TAB,TAB,[' Loading file from disk.'],'CR,0
CALL GETDISK ! JMP HEXPRM6 ;GO TO HEX DUMP ROUTINE
;
BADFL CALL CLS ! JMP MENU
;
WRITPRM CALL CLS ! CALL ILPRT
DB CR,LF,TAB,TAB,TAB,[' Program EPROM ']
DB CR,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF,LF
DB LF,LF,LF,LF,LF,LF,LF,LF,LF,TAB,TAB,TAB
DB 'File name to read from: ',0
CALL GETNAME ! CPI 0 ! JZ BADFL ;NULL FILE NAME... ABORT
CALL CLS ! CALL ILPRT
DB TAB,TAB,TAB,[' Loading file from disk.'],'CR,0
CALL GETDISK ;SUCK IN FILE FROM DISK
CALL ILPRT
DB TAB,TAB,TAB,[' Programming EPROM. ]
DB CR,LF,LF,LF,CR,0
CALL BURN ;PROGRAM THE PROM
CALL CLS ! JMP MENU
;
BURN LXI H,0000H ! SHLD PRMCONT ! LXI H,PROMBUF ! SHLD PRMSTRT
BURN1 CALL LATCH ;LATCH THE ADDRESS
CALL PROG ;PROGRAM THE PROM
CALL PREAD ;READ BACK THE BYTE
LDA ADATA ;GET THE DATA FROM THE PROM
LHLD PRMSTRT ;GET THE POSITION IN THE BUFFER IN H
CMP M
JNZ BURN2 ;ERROR IN PROM PROGRAM
BURN5 CALL PWRITE ;PUT IT IN WRITE MODE
CALL PNEXT ;NEXT LOCATION
;
JC BURN1
CALL ILPRT
DB CR,TAB,TAB,TAB,[' EPROM Programmed - hit any key'],'CR,0
BURN6 MVI C,6 ! MVI E,OFFH ! CALL BDOS ! CPI 0 ! JZ BURN6 ! RET
;
BURN2 CALL PWRITE ! CALL ILPRT
DB BEL, [' Programming Error - <C to abort'],'CR,0
BURN3 MVI C,6 ! MVI E,OFFH ! CALL BDOS ! CPI 0 ! JZ BURN3 !
CPI 'C'-40H ! RZ ! CALL ILPRT
DB CR,TAB,TAB,TAB,' '
DB ' ',CR,0
JMP BURN5
;
PROC LDA PRMSTRT ! ANI 00001111B ! CPI 0 ! JNZ PROC1
CALL ILPRT
DB CR,TAB,TAB,TAB,' '
DB CR,TAB,TAB,TAB,0
LHLD PRMSTRT ! CALL HEXADR
PROC1 LHLD PRMSTRT ;GET THE MEMORY LOCATION
MOV A,M ;GET THE BYTE FROM MEMORY
STA ADATA ;PUT IN A DATA REGISTER
LDA XTAL+4 ;HIGH PULSE
STA BDAT ! CALL WAIT ;WAIT 50 MSEC
LDA XTAL+5 ;LOW PULSE
STA BDAT ! CALL WAIT ! RET
;
WAIT PUSH B ! LXI B,TKILL ;50 MS DELAY
DELAY1 DCX B ! MOV A,B ! ORA C ! JNZ DELAY1 ! POP B ! RET
;
GETDISK MVI A,0 ! STA FCB+14 ! MVI C,OFFH ! LXI D,FCB
CALL BDOS ! CPI OFFH ! JZ DISK1 ;CAN'T FIND THE FILE
LDA NUMSEC ! MOV B,A ;GET THE MAXIMUM NUMBER OF SECTORS
LXI D,PROMBUF ;POINT TO START OF PROM BUFFER
;
DISK2 PUSH B ! PUSH D ! MVI C,1AH ! CALL BDOS ;SET DMA
MVI C,14H ! LXI D,FCB ! CALL BDOS
CPI 0 ! JNZ DISK3 ;FILE IS TOO SHORT...
POP D ! XCHG ! LXI D,128 ! DAD D ;ADD ONE SECTOR
XCHG ! POP B ! DCR B ! JNZ DISK2 ;LOOP 'TIL DONE
;
DISK4 MVI C,10H ! LXI D,FCB ! CALL BDOS ! RET ;CLOSE FILE
DISK3 POP D ! POP B ! JMP DISK4
DISK1 CALL ILPRT
DB TAB,TAB,TAB,[' Cannot find file - hit any key'],'CR,LF,0
DISK9 MVI C,6 ! MVI E,OFFH ! CALL BDOS ! CPI 0 ! JZ DISK9
POP H ! JMP MENU
;
BLANK CALL CLS ! CALL ILPRT
DB CR,LF,TAB,TAB,TAB,[' Verify Blank EPROM ']

```

[illegible]



```

JM SEEHEX1 ! CPI 'z'+1 ! JP SEEHEX1 ! CPI EL ! JZ SEEHEX1
SEEHEX3 LHL ASCSTH ! INX H ! SHLD ASCSTH ! MOV M,A ! JMP SEEHEX2
SEEHEX1 MVI A,'.' ! JMP SEEHEX3
SEEHEX2 MVI C,9 ! LXI D,HEXBUF ! CALL BDOS ! POP D ! POP H ! RET
;
HEXCON STA HEXSTH ! ANI 00001111B ! LXI H,HEXSTR ! LXI D,0
MOV E,A ! DAD D ! MOV A,M ! STA HEXBUF+2 ! LDA HEXSTH
ANI 11110000B ! RRC ! RRC ! RRC ! RRC ! LXI H,HEXSTR
LXI D,0 ! MOV E,A ! DAD D ! MOV A,M ! STA HEXBUF+1 ! RET
;
GETPRM LXI H,0000H ! SHLD PRMCNT ! LXI H,PROMBUF ! SHLD PRMSTR
GETPRM1 CALL LATCH ! CALL PREAD ! LDA ADATA ! LHL PRMSTR
MOV M,A ! CALL PWRITE ! CALL PNEXT ! JC GETPRM1 ! RET
;
PNEXT PUSH H ! LHL PRMCNT ! INX H ! SHLD PRMCNT ! LHL PRMSTR
INX H ! SHLD PRMSTR ! LHL PRMEND ! XCHG
POP H ! CALL COMPARE ! RET
;
COMPARE MOV A,D ! CMP H ! JNZ COMPI ! MOV A,E ! CMP L
JNZ COMPI ! STC ! CMC ! RET
COMPI STC ! RET
;
PWRITE LDA XTABL+7 ! STA BDATA ! MVI A,0 ! STA ACONTR ! MVI A,OFFH
STA ADATA ! MVI A,04H ! STA ACONTR ! RET
;
PREAD MVI A,0 ! STA ACONTR ! STA ADATA ! MVI A,04H ! STA ACONTR
LDA XTABL+6 ! STA BDATA ! RET
;
LATCH LDA PRMCNT ! STA ADATA ! LDA XTABL ! STA BDATA ! LDA XTABL+1
STA BDATA ! LDA PRMCNT+1 ! STA ADATA ! LDA XTABL+2 ! STA BDATA
LDA XTABL+3 ! STA BDATA ! RET
;
RUB MVI C,9 ! LXI D,RUBMS ! CALL BDOS ! RET
RUBMS DB BS,' ',BS,EL
;
CLS MVI B,25
CLS1 PUSH B ! MVI C,2 ! MVI E,LF ! CALL BDOS ! POP B ! DCR B
JNZ CLS1 ! MVI C,2 ! MVI E,HM ! CALL BDOS ! RET
;
INIT MVI A,0 ! STA ACONTR ! STA BCONTR ! MVI A,OFFH ! STA ADATA
MVI A,03FH ! STA BDATA ! MVI A,04H ! STA ACONTR ! STA BCONTR
LDA BDATA ! ANI 0CH ! STA LOCDEV ! MVI A,0 ! STA BDATA
MVI A,0C0H ! LXI H,LOCDEV ! CHM H ! JNZ INIT1
MVI A,07FH ! STA BDATA ! JMP INIT2
INIT1 MVI A,03FH ! STA BDATA
INIT2 MVI A,04H ! STA BCONTR ! MVI A,0 ! STA BDATA ! RET
;
DEVICE LDA LOCDEV
CPI 0 ! JZ D2716
CPI 64 ! JZ D2732
CPI 128 ! JZ D2732A
CPI 192 ! JZ D2764
CALL ILPRT
DERRMS DB TAB,TAB,BEL,'Arg!!! A device error.',CR,LF
DB TAB,TAB,'Check the card. Aborting...',CR,LF,LF,LF,0
JMP QUIT
;
D2716 CALL ILPRT
DB 'Type 2716 EPROM',CR,LF,0
LXI H,0800H+PROMBUF-1 ! SHLD PRMEND ! MVI A,(2048/128)
STA NUMSEC ! LXI H,T2716 ! CALL VARS ! RET
D2732 CALL ILPRT
DB 'Type 2732 EPROM',CR,LF,0
LXI H,01000H+PROMBUF-1 ! SHLD PRMEND ! MVI A,(4096/128)
STA NUMSEC ! LXI H,T2732 ! CALL VARS ! RET
D2732A CALL ILPRT
DB 'Type 2732A EPROM',CR,LF,0
LXI H,01000H+PROMBUF-1 ! SHLD PRMEND ! MVI A,(4096/128)
STA NUMSEC ! LXI H,T2732 ! CALL VARS ! RET
D2764 CALL ILPRT
DB 'Type 2764 EPROM',CR,LF,0
LXI H,02000H+PROMBUF-1 ! SHLD PRMEND ! MVI A,(8192/128)
STA NUMSEC ! LXI H,T2764 ! CALL VARS ! RET
;
VARS MVI B,8 ! LXI D,XTABL ! PATCH IN FUDGE TABLES
VARS1 MOV A,M ! STAX D ! INX H ! INX D ! DCR B ! JNZ VARS1 ! RET
;
ILPRT XTHL
ILPLF MOV A,M ! ORA A ! JZ ILPRET ! PUSH B ! PUSH D ! PUSH H
MOV E,A ! MVI C,2 ! CALL BDOS ! POP H ! POP D ! POP B
INX H ! JMP ILPLF
ILPRET XTHL ! RET
;
HEXSTR DB '0123456789ABCDEF'
HEXBUF DB '$'
ASCBUF DB ' ',CR,LF,EL
LOCDEV DS 1 ;PLACE TO SAVE LOCAL DEVICE NUMBER
PRMSTR DS 2 ;START OF PROM
PRMEND DS 2 ;END OF PROM
PRMCNT DS 2 ;POINTER INTO PROM WHILE PROGRAMMING
HEXSTH DS 1
ASCSTH DS 1 ;POINTER INTO ASCII BUFFER
NUMSEC DS 1 ;NUMBER OF SECTORS IN EPROM
CONBUF DS 20 ;NAME INPUT BUFFER
;
EPROM FUDGE TABLES
T2716 DB 39H,38H,3AH,38H,3CH,38H,30H,38H
T2732 DB 25H,24H,26H,24H,30H,24H,20H,24H
T2764 DB 75H,74H,76H,74H,30H,74H,70H,74H
XTABL DS 8
DS 120
STACK DS 2
END

```

## The Blast

While the actual process of blasting the bytes of the chip is a bit bizarre, it doesn't involve very much code. The main aspect of the function can be seen at the routine BURN. The procedure for programming a byte is to latch an address, program the byte pointed to by the address, read the byte and make sure that the byte we get back is the same as the byte we initially burned into the chip.

Each of these functions is handled by subroutines. The latching process is one of the bowings and scrapings for the peculiar design of the EPROM blaster's hardware. By setting the condition of location BDATA the card can be told whether it is to regard the byte it is given as being the low byte of an address, the high byte of an address, a command to write data or a command to get a byte from the EPROM.

Because the card was designed to work under the 6502, which handles everything... addresses included... in byte sized chunks it has to handle its sixteen bit address manifestations in two mouthfuls like this.

Having latched an address the card can be instructed to either read or write the byte pointed to. The data transfer location of the card... analogous to CP/M's DMA buffer... is ADATA. If you tell the card to write a byte it will do so with the byte at this location. If you tell it to read it will put the byte it gets at ADATA.

By checking each byte as it is written there is no need to verify that an EPROM has been correctly programmed. Assuming that the process doesn't barf and throw an error halfway through the burn the chip can be assumed to be uncorrupted.

The only really tricky thing about handling the card and its EPROMs is in the changes one must make to deal with the different chips. The Multiflex programmer supports 2716's, 2732's, 2732A's... not the same thing... and 2764's. In changing chips the data which is used to drive the latching routine and the reading and writing code varies.

In order to get around this the driver uses a set of fudge tables. The driver is able to tell what sort of chip it is expected to program by reading the byte at LOCDEV, which is essentially a way to check out the permutation of wires on the DIP header. If you look at the routine at DEVICE you will note that there are four possible bytes which return legal configurations.

Of course, this assumes that you've plugged in the jumper that corresponds to the chip you have in the card. Woe betide you if you don't.

Having ascertained which chip it's looking at, the driver sets up a number of parameters. Knowing the chip it knows the number of sectors in a file which will program it and stashes this value in NUMSEC. It also knows which of the fudge tables it wants. These live at the end of the program, starting with T2716. The VARS routine patches one of these into the buffer at XTABL, which is where LATCH, PREAD and PWRITE will look for it.

## PROMinade

This thing is a bit long... it has been compacted here to keep it from running on for pages. However, having typed it in you should be able to blast the EPROMs of your choice under CP/M. This is exceedingly useful for developing dedicated firmware, of course, but it's also a convenient environment for general chip farming. The development tools available to CP/M programmers are a lot slicker than those one finds under DOS.

If you are up for hacking 6502 under CP/M, you might want to check out 6502SIM, a public domain package which emulates a 6502 in Z80 software.

Blast away...

CNI



## Blort! for the PC

**They said it couldn't be done... mind, they also said it shouldn't be done. Regardless, we present Blort! for the PC.**

by John Rudzinski

One of the troublesome things about an off the shelf IBM PC is that it's stuffed with a monochrome card. The card itself isn't troublesome... as far as cards go it's the bees' knees, but it can't display high resolution graphics. This isn't a problem if you're heavily into word processing, but it severely limits your game playing capabilities.

The other side of the coin is a typical MS-DOS based system... what the people at IBM call a clone... that comes equipped with a colour card, but no monochrome card. While the disadvantages to this setup are not necessarily immediately apparent, you're bound to turn up more than one program along the way that appears to hang your system or do creative things to your display. Often, the fault lies with the program's writing to the monochrome card, not compatibility problems with strange BIOS's.

For the user, there are three ways to cope with card specific software. You can purchase the card you're missing, buy a specialised video card (we had a look at a few in the May issue of Computing Now!), or do without the software. For the programmer, the situation is also flexible. You could write one version of the software and include drivers for both... and perhaps other... cards, write two or more versions of the program or ignore the cards altogether and print characters to whatever screen happens to be glowing when the program begins execution. Colour and low, medium or high resolution applications, of course, require the proper card.

## Essential Blort!

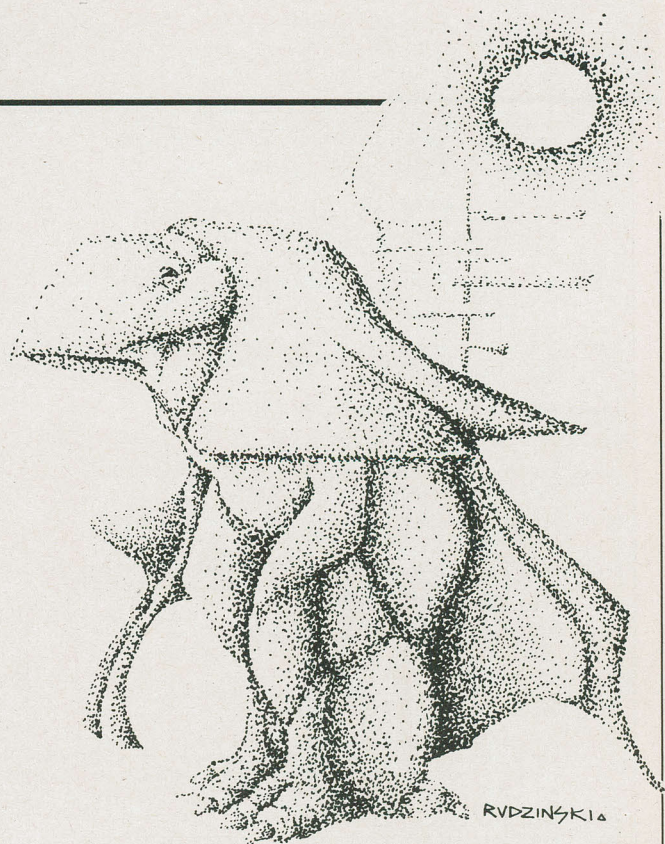
Blort! is a video game of sorts. It was originally written for the Apple. While games with very attractive graphics written in machine language are a great deal of fun to play, their source files usually take several boxes of printer paper to commit to hard copy and are, for this reason, largely impractical for publishing in a magazine. You don't really want to type for three and a half weeks... I didn't think so.

Blort!, with this in mind, uses ASCII characters for its screen display.

In order to make the PC version of Blort! compatible with both monochrome and colour cards I chose the screen printing method. While slower in execution and massively bulkier in code, this method allows the program to run on the majority of IBM compatibles... at least those which *try* to emulate the PC.

Blort!, if you recall the January 1985 issue of Computing Now!, is a fast text-only game for the Apple. The IBM PC implementation presented here is similar, though it has obvious differences. To begin, it boots up into eighty columns. The reason for this is mainly due to forty columns looking silly on a monochrome monitor. The ship, landmine and alien characters are different, notably because the PC has a more intriguing character set available to it. As mentioned before, the program prints to the screen instead of POKEing directly into the screen RAM. This has an unfortunate side effect of characters seeming to have double images at times.

Excepting the eighty column screen width, Blort! for the PC plays and behaves exactly like the Apple version. Your ship



hovers above the ground and moves back and forth on its own accord. The aliens transport themselves similarly in the air. You can change the ship's direction with the Z and X keys, or zap the landmines which occur during the second level with the A key.

Hitting the spacebar fires off a shot and the escape key will terminate the game and bring the MS-DOS prompt back. Shooting aliens gets you points. Flying over landmines gets you dead.

```
;,,,,,,,,,,,,,,;
;
;          Blort!
;
;    by John Rudzinski
;    (c) 1985 HennSoft
;
;    IBM-PC Version .2
;
;    Soon to be a major motion
;    picture.
;
;,,,,,,,,,,,,,,;
;
PRINT      MACRO   STRING                      ;Print string
            MOV     DX,OFFSET STRING
            MOV     AH,9
            INT     21H
            ENDM
COORD      MACRO   ROW,COLUMN,PAGE             ;Cursor set
            MOV     DH,ROW
            MOV     DL,COLUMN
            MOV     BH,PAGE
            MOV     AH,2
            INT     10H
            ENDM
READ       MACRO                     ;Read a location
            MOV     BH,0                ;Character in AL
            MOV     AH,8
            INT     10H
            ENDM
```



```

WRITE MACRO CHR ;Write a location
MOV AL,CHR
MOV BH,00
MOV CX,1
MOV AH,10
INT 10H
ENDM
BEEP MACRO
MOV AL,7 ;Bell (teletype)
MOV AH,14
MOV BH,1
INT 10H
ENDM
ALMAC MACRO ANM ;Store alien
MOV AL,ANM
MOV TEMP,AL
JMP AMOVE
ENDM
SHOVE MACRO ;PUSH registers
PUSH AX
PUSH BX
PUSH CX
PUSH DX
STI
ENDM
YANK MACRO ;POP registers
POP DX
POP CX
POP BX
POP AX
ENDM

;
STACK SEGMENT PARA STACK 'STACK'
DW 128 DUP(0)
STACK ENDS
DATA SEGMENT PARA PUBLIC 'DATA'
TPAGE DB 'Blort!',ODH,0AH,0AH
DB 'by John Rudzinski',ODH,0AH
DB '(c) 1985 HennSoft',ODH,0AH,0AH
DB 'IBM-PC Version .2',ODH,0AH,0AH,0AH
DB 'A = Kill landmine',ODH,0AH
DB 'Z = Left',ODH,0AH
DB 'X = Right',ODH,0AH
DB '[SPACE] = Fire',ODH,0AH
DB '[ESC] = Quit',ODH,0AH,0AH
DB 'Hit any key to begin','$'
LEV_STR DB 'Level: 1'
DB 27 DUP(20H) ;27 spaces
DB 'Blort!'
DB 24 DUP(20H) ;24 spaces
DB 'Score: 000000','$'
DB ','
BORDCHR DB
USKOR DB 78 DUP('_', '$')
ESC DB 1BH
SPACE DB 20H
DOT1 DB 0B2H
LEN DW 550H
ALONE DB 0FH ;Sun
ALTWO DB 02H ;Happyface
ALTHR DB 99H ;Strange gaffer
ALFOU DB 9DH ;Weird character
SHIP DB 1EH ;Up pointer
LANDM DB 17H ;Another weird character
MISSL DB 21H ;Exclamation mark
TWO SHP DW 1E1EH, '$' ;Ships remaining
COUNT DB 00H
TEMP DB 00
SHIPROW DB 22 ;Ship row
SHIPCOL DB 39 ;Ship column
SHIPL DB 01 ;Ship left?
SHIPR DB 00 ;Ship right?
SHOTR DB 00 ;Shot row
SHOTC DB 00 ;Shot column
LANDROW DB 23 ;Landmine row

```

```

LANDCOL DB 39 ;Landmine column
FIRE DB 00 ;Shot fired?
LAND DB 00 ;Landmine enabled?
ALROW DB 05 ;Alien row
ALCOL DB 78 ;Alien column
ALEFT DB 01 ;Alien left pointer
ARITE DB 00 ;Alien right pointer
ALNUM DB 01 ;Number of alien
LEVL DB 01 ;Game level
DATA ENDS
;
CODE SEGMENT PARA PUBLIC 'CODE'
START PROC FAR
ASSUME CS:CODE
PUSH DS
MOV AX,0
PUSH AX
MOV AX,DATA
MOV ES,AX
ASSUME ES:DATA
MOV DS,AX
ASSUME DS:DATA

;
GO: CALL TTLPAGE ;Show title page
CALL SETUP ;Initialise game screen

;
MAIN: CALL KEY? ;Check keyboard status
CALL D_LAY ;Pause
CALL SHOT? ;Check missile status
CALL D_LAY ;Wait
CALL ALIEN? ;Check alien status
CALL D_LAY ;Procrastinate
CALL MINE? ;Check landmine status
JNC MAIN ;Main loop
JMP GO

;
TTLPAGE PROC NEAR
SHOVE
MOV AH,00
MOV AL,2
MOV BL,0FH
INT 10H ;80x25 B/W
MOV AH,05
MOV AL,00
INT 10H ;page number
MOV CH,13
MOV CL,13
MOV AH,1
INT 10H ;No cursor
MOV AL,0
MOV CH,0
MOV CL,0
MOV DH,24
MOV DL,79
MOV BH, ' ' ;Screen scroll
MOV DX,OFFSET TPAGE
MOV AH,9
INT 21H ;Print title page
MOV AH,0CH ;Clear keyboard and
MOV AL,8 ;wait for
INT 21H ;keypress.
YANK
RET
TTLPAGE ENDP
;
SETUP PROC NEAR
SHOVE
MOV AH,6
MOV AL,0
MOV CX,0
MOV DH,24
MOV DL,79
MOV BH,0FH
INT 10H ;Clear screen

```



# Blort! for the PC

```

COORD 2,1,0 ;Print them at proper co-ords
PRINT USKOR ;First 78 underscores, then
COORD 23,1,0
PRINT USKOR ;bottom row.
COORD 1,1,0
PRINT LEV STR ;Print info string
COORD 0,77,0 ;Row,column,page for extra ships
PRINT TWOSHIP ;Print 'em
COORD ALROW,ALCOL,0 ;1st alien location
WRITE ALONE ;Print 1st alien
COORD SHIPROW,SHIPCOL,0 ;Player's ship
WRITE SHIP
YANK ;POP all registers
RET
SETUP ENDP
;
KEY? PROC NEAR
SHOVE ;PUSH all registers
MOV DL,OFFH
INT 21H ;Check for keypress
CMP AL,'a' ;Landmine removal?
JNE KCO
CMP LAND,1 ;Landmine enabled?
JNE KEYOUT
COORD 23,39,0 ;Mine location
WRITE BORDCHR ;Null mine out
DEC LAND ;Disable mine
JMP KEYOUT
KCO: CMP AL,'z' ;Left
JNE KC1
CMP SHIPL,1 ;Already going left?
JE KEYOUT ;If so, ignore.
DEC SHIPR ;Disable right and
INC SHIPL ;enable left movement
JMP KEYOUT
KC1: CMP AL,'x' ;Right
JNE KC2
CMP SHIPR,1 ;Already right?
JE KEYOUT
INC SHIPR ;Enable right and
DEC SHIPL ;disable left.
JMP KEYOUT
KC2: CMP AL,' ' ;Fire (spacebar)
JNE KC3
CMP FIRE,1 ;Missile onscreen?
JE KEYOUT
MOV FIRE,1 ;Load turrent
JMP KEYOUT
KC3: CMP AL,1BH ;ESCAPE key
JNE KEYOUT
MOV AH,04CH
INT 21H ;Back to DOS
KEYOUT: MOV AH,0CH
MOV AL,6
MOV DL,OFFH
INT 21H ;Clear keyboard
MOV AL,0
CMP SHIPL,1
JNE RITE
COORD 22,1,0
READ
CMP AL,SHIP ;Ship at left border?
JE COMP
SM: COORD SHIPROW,SHIPCOL,0
WRITE SPACE
DEC SHIPCOL
COORD SHIPROW,SHIPCOL,0
WRITE SHIP ;Update ship position
KOUT: YANK
RET
COMP: JMP RDIR
RITE: COORD 22,77,0
READ
CMP AL,SHIP ;Ship in right border?

```

```

JE LDIR ;Change direction
SMOVE: COORD SHIPROW,SHIPCOL,0
WRITE SPACE
INC SHIPCOL
COORD SHIPROW,SHIPCOL,0
WRITE SHIP ;Move ship right
JMP KOUT
RDIR: INC SHIPR ;Reverse ship right
DEC SHIPL
JMP SMOVE
LDIR: INC SHIPL ;Reverse ship left
DEC SHIPR
JMP SM
KEY? ENDP
;
SHOT? PROC NEAR
SHOVE
CMP FIRE,1 ;Shot active
JNE COMP2 ;If not, leave.
CMP SHOTC,0 ;New shot?
JA SUPDTE ;if not, update.
MOV DL,SHIPCOL
MOV SHOTC,DL
MOV DH,SHIPROW
DEC DH
MOV SHOTR,DH
COORD SHOTR,SHOTC,0
WRITE MISSL ;One row above ship
COMP2: JMP SHOTOUT
SUPDTE: COORD SHOTR,SHOTC,0
WRITE SPACE ;Blank missile
DEC SHOTR ;Move up a row
CMP SHOTR,5 ;Alien territory?
JNE BORCHK
MOV AL,ALCOL
CMP SHOTC,AL ;Collision?
JNE BORCHK
COORD SHOTR,SHOTC,0
WRITE MISSL
CALL XPLO
JMP SHOTOUT
BORCHK: CMP SHOTR,2 ;Reached border?
JNE PRNTIT
DEC FIRE
MOV SHOTC,0
JMP SHOTOUT
PRNTIT: COORD SHOTR,SHOTC,0
WRITE MISSL
SHOTOUT: YANK
RET
SHOT? ENDP
;
ALIEN? PROC
SHOVE
CMP ALNUM,1
JNE A1
FAL: ALMAC ALONE
A1: CMP ALNUM,2
JNE A2
ALMAC ALTWO
A2: CMP ALNUM,3
JNE A3
ALMAC ALTHR
A3: CMP ALNUM,4
JNE A4
ALMAC ALFOU
A4: MOV ALNUM,1
JMP FAL ;Just in case
AMOVE: CMP ALEFT,1 ;Go in' left?
JNE RECHTS
COORD 5,1,0
READ
CMP AL,SPACE ;Left border clear?
JNE COMP3

```



# Almost Free PC Software

You can get bored of Lotus 1-2-3 after a while... some of us can do it almost before it boots. You can also get bored of WordStar, SuperCalc and AutoCAD. BASIC has enormous possibilities for boredom, while dBase III has been described as being one of the most potentially boring bits of software since the first release of CompuStiff's famous Grave Digger's Database. We won't even get into accounting packages.

Commercial software can be stupendously, tediously, mind numbingly boring unless you have little utilities, patches, fixes and other synthetic trolls to keep your computer partying. This is, of course, why there is Almost Free Software.

In this, the fourth volume of Almost Free Software for the PC, we have rounded up a large collection of patches, games, utilities and business programs than ever before. This single disk contains no fewer than twenty eight unique programs... and, of course, no more than twenty eight unique programs. It's the nature of numbers to be dogmatic.

**BACKSCROLL** Possibly one of the cleverest DOS utilities, Backscroll hooks itself into the PC and buffers whatever scrolls by. Using a very well thought out command structure it allows one to scroll back and forth through text which would normally have scrolled off the screen into oblivion.

**BIGCAL** is a BASIC program which performs calculations on extremely large numbers. It handles data in floating point form, rather than in scientific notation, which allows for many places of accuracy.

**BUGS** is a weird little ASCII game. Using the cursor pad one zaps a nuclear fly swatter around the screen blowing up this long crawling bug. It's a scream.

**CLOCK** is a useful tutorial in writing character oriented device drivers for the PC, as well as being an improved replacement clock.SYS file for many real time clocks. The ASM file is included.

**CRYPTO** is a BASIC program which descrambles cryptograms. It's an interesting study for puzzle freaks.

**DEFRAG** is a utility that will allow you to "defragment" your disks and make your applications generally run a lot faster. It re-organizes a disk, connecting up the fragments of files created by DOS.

**DOSEEDIT** is one of the most useful DOS utilities available. It enhances the command line editing facility of MS-DOS by creating a command stack. Now, rather than just being able to recall the last command with F3 the cursor arrows allow you to scroll through a whole stack of previous commands, re-executing the ones you need.

**DUMP** is a program to produce hex dumps of object files. It's both useful in its own right and a good example of how to use the DOS disk service calls. The ASM file is also included.

**FREE** is a very tiny file that tells you how much free space you have on a disk... without watching a whole directory listing scroll by. It's especially handy on hard drives.

**KBFIX** displays the status of the keyboard lock keys on the screen and makes the keyboard's character buffer longer to avoid losing bytes.

**LABEL** changes the labels on drive volumes. It's a simple thing, but useful if you use the labels to keep track of your disks.

**LIST** is an improvement over TYPE. It shows you the contents of a file with paging, and in a much more civilized fashion.

**MEMBRAIN** is the most sophisticated RAM disk program we've seen yet. It allows for variable sized disks and a number of other parameters.

**MONOCLOCK** is a screen clock displays program to work on PCs with monochrome displays.

**MOVE** is a program which moves and optionally erases files. However, you can have it query you about wild cards, such that you don't have to move all the files specified by a wild card. It's very useful.

**NEWBELL** is a tiny germ of code which changes the sound of the PC's control G beep. It's almost useless, but it's very small.

**NUSQ** is a file unsqueezzer. It's a particularly useful for people who download squeezed files from bulletin boards and need a way to get them unsquozed.

**PARCHK** is a trap to keep the system from locking up and saying "parity error" every time one of these little nasties comes down. It gives you the option of finding out what caused the error and recovering from it.

**PURGEDUP** is a very sophisticated program for killing off obsolete backup files. It's of great use on a hard drive... which tends to get filled up with abandoned files quite easily.

**PX** is a cross reference generator for assembler programs. It helps you keep track of where you put procedures in large files.

**QS** is a DOS patch which eliminates the wait one normally experiences while the PC checks out its brains prior to booting. It's not compatible with everything, but it's still extremely handy.

**SDIR** is an improved sorted directory program.

**SP** is a very clever print spooler. It will allow you to print files into a RAM buffer and have the PC send them to the printer in the background while you move on to other things.

**SPACEINVADEERS** This a bit of variation on the popular arcade game, but it's fast and the graphics are superb. Green blood will ooze from your drives.

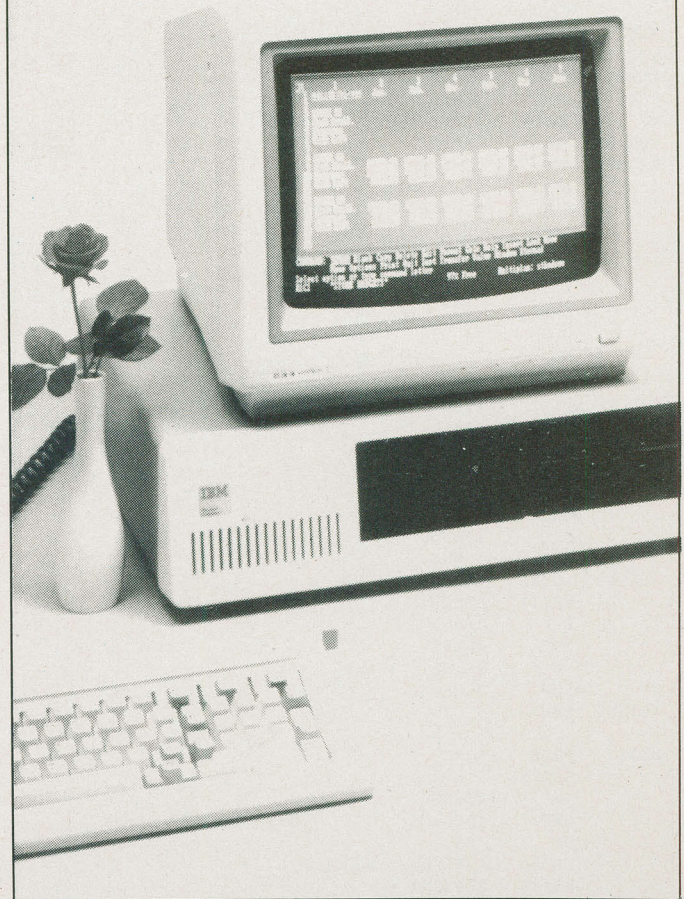
**SPEED** is a very simple program which changes some of the PC's floppy disk parameters and effectively speeds up the disk accesses for some applications.

**VDEL** is a multiple file deletion program that queries you prior to snuffing each entry. It's a bit like MOVE but it's much smaller.

**WHEREIS** will locate a file on a disk even if it lurks in a subdirectory. It's primarily useful on hard disk systems.

**WIZARDS** is an adventure game in the classic style... except that it is easily the most sarcastic program in creation. It's profoundly huge... you can wander about its darkened corridors for hours.

## Volume Four



This disk, with all of the programs listed here plus the appropriate documentation files is available for a mere

**\$19.95**

plus seven percent Ontario sales tax

**Almost Free PC**  
**Moorshead Publications**  
**25 Overlea Boulevard**  
**Suite 601**  
**Toronto, Ontario**  
**M4H 1B1**

or, if you want to be high tech you can order by phone. Call

**1-416-423-3262**

during business hours. Have your VISA, Mastercard or American Express card handy.

**Fine Print:** This software has all been collected from public bulletin boards and is believed to be in the public domain. The fee charged for it is to defer our cost in collecting it, testing it and putting this collection together, and for the cost of the media and its handling.

While we have endeavoured to make sure that this software does what it says it does, and while it has exhibited no bugs while we were using it, it is possible that some of it may not function properly on some PC compatible systems. We are unable to assist you in modifying this software for your applications.

Moorshead publications warrants that the disk you receive will be readable. However, the post office may have other plans. If you are unable to read your disk please return it to us for replacement.



# Blort! for the PC

```

COORD ALROW,ALCOL,0
READ
CMP AL,SPACE ;Next location free?
JE XCHNG ;Yes, print alien
CALL XPLO
ALBYE: YANK
RET
XCHNG: COORD ALROW,ALCOL,0
WRITE TEMP
JMP ALBYE
COMP3: JMP CHRIG
RECHTS: COORD 5,78,0
READ
CMP AL,SPACE ;Right border clear?
JNE CHLEF
COORD ALROW,ALCOL,0
WRITE SPACE ;Blank old location
INC ALCOL
COORD ALROW,ALCOL,0
READ
CMP AL,SPACE ;Next location free?
JE XCHNG
CALL XPLO
JMP ALBYE
CHRIG: COORD ALROW,ALCOL,0
WRITE SPACE
INC ALCOL
INC ARITE
DEC ALEFT ;Moving right
JMP XCHNG
CHLEF: COORD ALROW,ALCOL,0
WRITE SPACE
DEC ALCOL
INC ALEFT
DEC ARITE ;Going left
JMP XCHNG
ALIEN? ENDP
;
MINE? PROC NEAR
SHOVE
INC COUNT
CMP LEVL,02 ;Only L#2 has mines
JE CONT
COORD LANDROW,LANDCOL,0
WRITE BORDCHR
JMP LANOUT
CONT: CMP LAND,01 ;Landmine already there?
JB LINIT ;Maybe we can make one
LCHK: MOV AL,SHIPCOL
CMP LANDCOL,AL ;If same, collision.
JE LBOOM
PART: JMP LANOUT
LINIT: CMP COUNT,35
JB PART ;If below 35 or...
CMP COUNT,39
JA PART ;above 39, no mine.
INC LAND
COORD LANDROW,LANDCOL,0
WRITE LANDM ;Lay mine
JMP LCHK
LBOOM: DEC LAND
BEEP
COORD LANDROW,LANDCOL,0
WRITE BORDCHR ;Wipe mine
COORD SHIPROW,SHIPCOL,0
WRITE SPACE ;Wipe ship
COORD ALROW,ALCOL,0
WRITE SPACE ;Wipe alien
MOV ALROW,05
MOV ALCOL,77
CMP FIRE,01
JNE INACT
COORD SHOTR,SHOTC,0
WRITE SPACE ;Wipe missile
INACT: COORD 0,77,0

```

```

READ
CMP AL,1EH ;Ship there?
JNE DECSHP ;No, worse off
WRITE SPACE ;Kill it
JMP LANOUT
DECSHP: COORD 0,78,0
READ
CMP AL,1EH ;Ship there?
JNE BYE
WRITE SPACE
JMP LANOUT
BYE: MOV SHIPR,0 ;This is the
MOV SHOTR,0 ;chunk where
MOV SHOTC,0 ;we try to
MOV FIRE,0 ;put Humpty
MOV LAND,0 ;back together
MOV ARITE,0 ;again... pass
MOV SHIPL,1 ;me a brick.
MOV ALEFT,1
MOV ALNUM,1
MOV LEVL,1
MOV SHIPROW,22
MOV SHIPCOL,39
MOV LANDROW,23
MOV LANDCOL,39
MOV ALROW,05
MOV ALCOL,78
MOV LEN,550H
MOV CH,0
MOV CL,8
MOV AH,1
INT 10H ;Reset cursor
LANOUT: YANK
OR AL,AL ;Clear carry
RET
MINE? ENDP
;
D_LAY PROC NEAR
SHOVE
MOV CX,LEN
D1: LOOP D1
YANK
RET
D_LAY ENDP
;
XPLO PROC NEAR
SHOVE
BEEP ;Go beep and make
COORD SHOTR,SHOTC,0 ;cheap explosion
WRITE DOT1
CALL D_LAY
CALL D_LAY
CALL D_LAY
WRITE SPACE ;then wipe it out.
MOV ALROW,05
MOV ALCOL,77 ;alien position
MOV ALEFT,1
MOV ARITE,0
CALL UPSKOR
CMP ALNUM,02
JNE FORE
INC LEVL
COORD 1,8,0
WRITE 32H ;Indicate lvl#2 onscreen
MOV LEN,350H ;Faster action
UPAL: INC ALNUM ;Next alien
JMP XOUT
FORE: CMP ALNUM,04 ;Last alien printed?
JNE UPAL
DEC LEVL ;Level 1 again
COORD 1,8,0

```



```

WRITE 31H ;Say so
MOV ALNUM,01 ;Back to 1st alien
MOV LEN,550H ;Slower
XOUT: YANK
RET
XPLO ENDP
;
UPSKOR PROC
SHOVE
COORD 1,76,0
READ
CMP AL,39H ;900 yet?
JE MORAD
INC AL
WRITE AL,0
JMP UPOUT
MORAD: COORD 1,76,0
WRITE 30H
COORD 1,75,0
READ
CMP AL,39H ;9000?
JE TTHOU
INC AL
WRITE AL,0
JMP UPOUT
TTHOU: COORD 1,75,0
WRITE 30H
COORD 1,74,0
READ
CMP AL,39H ;90000?
JE HTHOU
INC AL
WRITE AL,0
JMP UPOUT
HTHOU: COORD 1,74,0
WRITE 30H
COORD 1,73,0
WRITE 31H
UPOUT: YANK
RET
UPSKOR ENDP
;
START ENDP
CODE ENDS
END START

```

## Blortfinger

Before you type in the code from listing one, ensure that you have the following programs. You'll need an editor of some sort to create the assembly file... WordStar in the N mode works fine. Because the listing makes extensive use of macros, you'll also need MASM and LINK. While in theory you could use the IBM small assembler, it's not suggested that you try as you'll need to type each macro out with its appropriate parameters. MASM and LINK are Microsoft products.

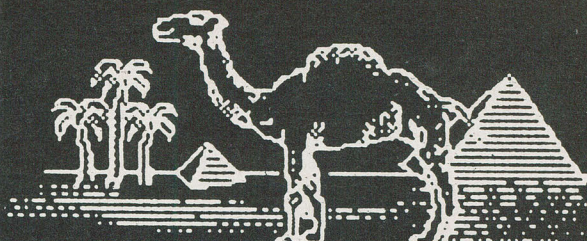
When you've finished typing the program into your editor, save the resultant file as BLORT!.ASM or something similar and then MASM it. If no errors occurred, LINK the file and you'll have BLORT!.EXE file residing on your drive. From there, just type BLORT! whenever you feel like testing your armchair agility.

Blort! doesn't purport to emulate video arcade games, and it doesn't. It is, however, a fast action two level text game which offers aliens to slaughter.

And, really... isn't that what life's all about?

CN!

# CAMEL TERM



## for Apple DOS

the only cost effective XMODEM/MODEM7 for DOS

If you're into telecommunications you'll know that transferring files under the tender mercies of Ma Bell can be something of an experiment in probability. If no one picks up the phone half way through and if some relay that was aging in the 1920's doesn't glitch and if the gods are kind your file might come across uncorrupted... maybe.

Because of these little pleasures users of many operating systems, such as CP/M and MS-DOS, enjoy a file transfer system called XMODEM/MODEM7, or the Christiansen transfer protocol, which checks all the data that passes between two ends of a phone line. Using a MODEM7 compatible terminal package at both ends of a transfer insures one of a better than ninety nine percent certain uncorrupted transfer.

This is of little comfort if you're running Apple DOS. At least it was, until now. For a limited time only... until the sun goes nova... we're pleased to be offering CamelTERM for the Apple II+. It combines the functions of a simple terminal program, a phone number library and automatic dialer and, most important, a checksum compatible MODEM7/XMODEM file transfer system.

Using CamelTERM you can call remote bulletin boards and download software. You can even call CP/M and MS-DOS based boards and download BASIC and PASCAL files for subsequent conversion to the Apple. You can also send files between two Apples without having to worry about them getting gorched.

Note that for MODEM7 to work both ends of the transfer must support it.

CamelTERM will cheerfully move binary files, machine language code and high resolution pictures. It will handle files up to twenty four kilobytes in length. It allows for multiple baud rates on serial cards which support them.

At present, CamelTERM supports the following Apple serial cards.

- PDA 232C with Hayes Smartmodem or equivalent.
- Hayes Micromodem II at 300 baud only.
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# COMPUTER PRESS

## LAN Ahoy!

MARKHAM, ONTARIO — With Canadian companies packing up and heading down south, it's refreshing to see American companies exploring the Canadian business frontier. One of these pioneers, *The Software Link Incorporated*, has a lot to offer to Canadian businesses concerned about the high cost of hardware networking.

The Software Link — an Atlanta, Georgia-based company — has opened offices in Canada, and has these products to offer:

- *MultiLink Advanced* is a unique software-driven network, which, when implemented on an IBM PC/AT, creates a true multi-user, multi-tasking environment for up to nine users or tasks. IBM PCs, PC/XTs and some compatibles can be used to drive smaller networks. Off-the-shelf PC-DOS software can be used, and expensive network interface boards are not required. While other installed PCs may be attached to the network as workstations, MultiLink Advanced can use cost-efficient terminals such as The Software Link's *PC-Shadow*. If more memory per user is required, a *JRAM-AT* memory expansion board will enable each user to access 448K of RAM. The *Multi-User COM:Port Board* with four ports is available should more serial ports be required. Other features of the network include file/record locking, task prioritization of up to eight levels of priority, and remote communications support.

- *LANLink* is essentially an on-disk local area network. Compatible with MultiLink Advanced, LANLink allows local area disk and printer sharing, networking PC-DOS and MS-DOS machines and, through its special feature *R-LAN*, gives users the ability to remotely interact with a LANLink network via modem. As the logic for the LAN is software-based, installation of LANLink is simple, required only cable connections and booting the server computer. The server, which may be an IBM PC, PC/XT or PC/AT (and some compatibles) requires an RS-232 serial port using an 8250 UART for each satellite. Satellites — equipment attached through RS-232 ports to the server — require an RS-232 port with the same chip. 95 per cent of all software packages operating under PC-DOS 2.0 or later are compatible with LANLink.

The Software Link Incorporated's Director of Canadian Sales and Marketing is Brian Smith. The company is located at 400 Esna Park Drive, Suite 18, Toronto (Markham), Ontario L3R 3K2. The company's sales department can be reached at (416) 477-5480, its technical support department at (416) 477-5482 and its computer bulletin board is available to modem users at (416) 477-5486.

## New Products

Hewlett-Packard's *LaserJet Printer* now has nine typefaces and over 100 supporting software packages. Canadian list prices for the printer's typeface-font cartridges range from \$362.00 to \$673.00. The LaserJet, priced at \$5439.00, includes the Courier typeface as standard and is capable of 300 by 300 dots-per-inch resolution ...

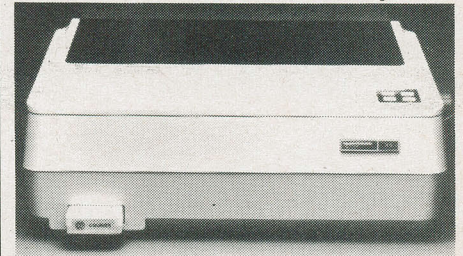
Available from *Duratech Marketing Incorporated*, the *Trace Station II* is an integrated security system for the Apple II, II+ and IIe computers. Fitting directly over the Apple, the station locks the computer to its desk. As well, it provides a power up lock, optional surge suppression and optional drive and monitor security ...

For IBM PC users who don't need all the ports of a multifunction card, *EMJ Data Systems Limited* is offering inexpensive **single-port cards** manufactured by Can-Am Designs. The serial port, addressable as either COM1: or COM2: retails for \$75.00 and the parallel and game ports both have a suggested list price of \$50.00 ...

*Toronto Online* is an authorized distributor of **Ven-Tel modems**. Sample items from the Ven-Tel line include the PCM-XT, a 1200 baud modem card for the PC/XT's short slots, an external RS232C modem and an internal 1200 baud modem for the Hewlett-Packard 150 computer. The PCM-XT and its longer counterpart for the IBM PC come standard with Crosstalk XVI software.

*RingQuest*, *Penguin Software's* sequel to *The Quest*, is now available to Apple adventurers. Again the adventurer and Gorn visit Balema, but this time the sorceress Lisa has fallen under control of the Ring of Chaos. The Ring of Order, presently in the adventurer's possession, is the key ...

Mannesmann Tally's new IBM PC compatible **MT85** and **MT86** dot matrix printers are available from *SGV Marketing Incorporated*. Both printers have a 3K buffer, a draft speed of



180 characters per second and a correspondence speed of 45 cps. In 10 pitch mode, the MT85 prints 80 characters per line, while the MT86 prints 136 characters per line. Optional plug-in correspondence font cartridges add flexibility to users' applications ...

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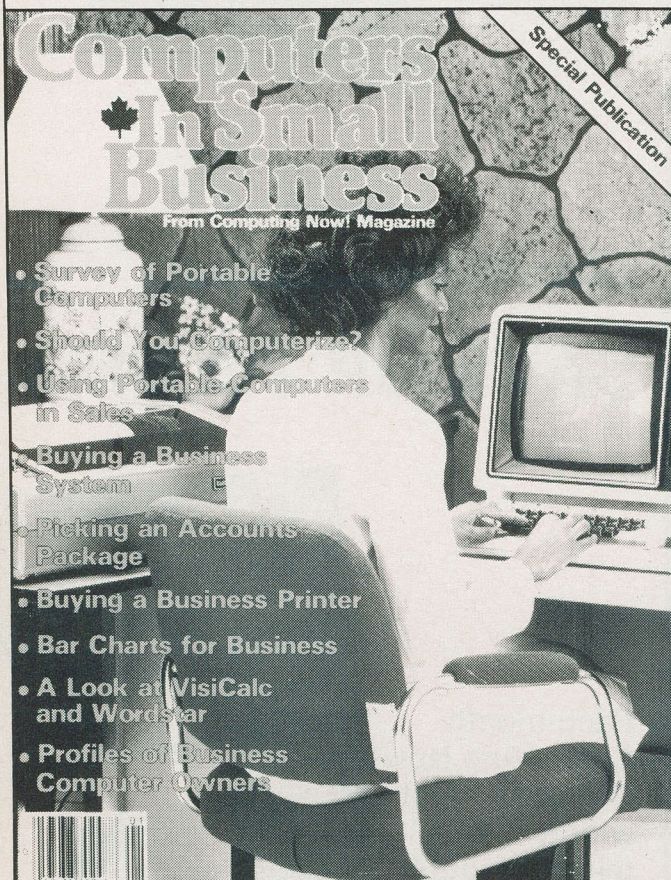
**SOFTWARE** clearance from \$6.95 for TRS-80, COCO, VIC-20. TI-99 & Atari Home Computers. Free Listing. Specify which computer. **T.M. COMPUTERS**, 786 Bath Road, Kingston, Ontario K7M 4Y2.

**BRIDGE** Game Software. 1 to 4 players \$39.95. IBM colour and Monochrome, Apple, ADAM, TI 99/4A, 16K TRS 80-1/3/4/Vic-20. **ALLAN'S MICROCOMPUTING**, Box 313, Azilda, Ontario, P0M 1B0 (705) 983-4341.

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# A Computer for Next to Nothing



**How about a really powerful business system for about five hundred dollars... it does seem a bit like someone's election promise. However, if you're prepared to travel a bit it can be real. Here's the whole party.**

**by Steve Rimmer**

**T**he state of the art is relative... if it works for you, it's sufficiently high tech. A sixteen bit computer can be a very useful thing. However, PC compatibles are expensive and there are still a lot of applications which will run as well or even better on an eight bit computer. This magazine, for example, has been almost entirely written, edited and typeset on eight bit systems.

The thought of using WordStar on an IBM to handle actual writing fills me with a sort of nameless dread.

Of course, if you can get your head around an eight bit computer you'll probably find that you don't have to wear all the fake gold off your VISA card to buy one. There are a lot of really inexpensive older style systems about. If you're up for a bit of hardware hacking you can probably do even better than this.

This feature is a look at what has to be the cheapest computer available. I got it going for under two hundred dollars but this is a bit unreasonable... I had most of the essential parts under an assortment of tables and dogs. However, starting from scratch one could get a working system going for about five or six bills if one was up for doing a bit of scrounging.

Now, yes, I know, there are computers available for a lot less than six hundred dollars. However, this is a serious machine. It has sixty-four kilobytes of memory, disks, a serial port, an eighty column screen and runs CP/M 2.2. It'll be quite happy with WordStar, SuperCalc, Microsoft BASIC, MODEM7... all the good stuff.

This all sounds fairly wild. To get it wilder still, the computer is... well, at heart, anyway... the Xerox 820, one of the most exclusive eight bit systems around.

## **There's a Catch, of Course**

The Xerox 820 is a very slick business system which is built around a single board computer. The board will stand alone all by itself. If you were to score a board, attach it to a power supply, a keyboard, a monitor and a disk drive and plug in the operating system it would be a fully functional machine.

Even Xerox computers croak occasionally. In many cases when one takes a Xerox 820 in to be serviced they don't fix the board. If the problem is nasty enough they simply replace the thing and trash the old one. This sounds really ghastly, I know.

As it turns out, they don't actually throw the old motherboards out. They sell them to a fellow named Max Southall. Max takes the boards, fixes them and sells them again for about a hundred and eighty dollars. This is a lot less than the cost of a Xerox 820.

Now, these things are hacker specials... while Max supports them quite well, Xerox will disavow any knowledge of their existence. However, this is cool. You don't need Xerox parts to get them up.

The boards will run with either eight or five and a quarter inch standard drives. Old single sided eight inch drives are very often available for less than a hundred dollars each. They use highly plebeian parallel standard ASCII keyboards... slimy old ones will do and you can use an Apple type keyboard if you're stuck with a bit of fidgeting. Likewise, the power supply requirements are fairly modest and you can get away with an Apple type power supply. Eight inch drives, if you use them, will want power supplies of their own as they take twenty-four volts.

The only moderately tricky bit is in hooking the thing to a monitor. It wants to drive a separate sync monitor, that is, one which takes the horizontal, vertical and video signals in on separate lines. You would have to build a sync combiner to make it work with a standard Zenith green screen.

The biggest hassle in making it all happen is probably in winding up all the connectors. The disk drive wants a DB 37... they're not all that common. The power supply is a peculiar nine pin Ampenol thing. The keyboard uses a DB 25 connector which are very easy to come by, as they are used in virtually everything with a serial port.

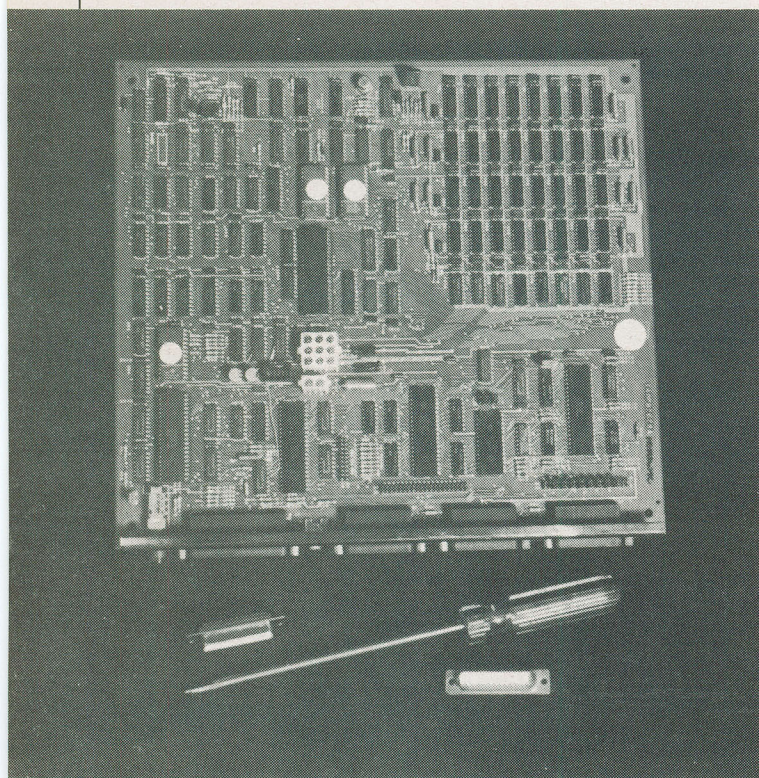
The video connector is an extremely obscure wombat, but it can be faked with a bit of .1 inch header pin socket.

## **Solder**

Having gotten all of the bits together the first ordeal is to solder all the connectors together... this will take some time. The power supply is the easiest. Its pinouts are



# A Computer for Next to Nothing



1	-12	Only for the serial port
2	+12	
3	+12	For the disk drives
4,5,6	Ground	
7	+12	Goes to the monitor... ignore
8,9	+5	The main drain

The twelve volts on pin three is needed if your disk drives will be getting their juice from the board. The twelve volts on pin seven goes straight out to another connector which used to drive the Xerox monitor. This might be useful if you try to run the board with one of those little five inch tubes from Exceltronix.

If you do use the monitor power connector you'll want to know that pin one is ground and pin two is the twelve volts from pin seven of the power supply connector.

The monitor signal connector is a black thing with ten pins, of which six are used. You can orient yourself with regard to it by finding the one and the six on the circuit board right beside it.

You can get a connector to fit this... at least in theory... but a carefully placed bit of header socket will do as well. The useful pins are

8	Vertical sync
9	Horizontal sync
10	Video signal
3,4,5	Ground

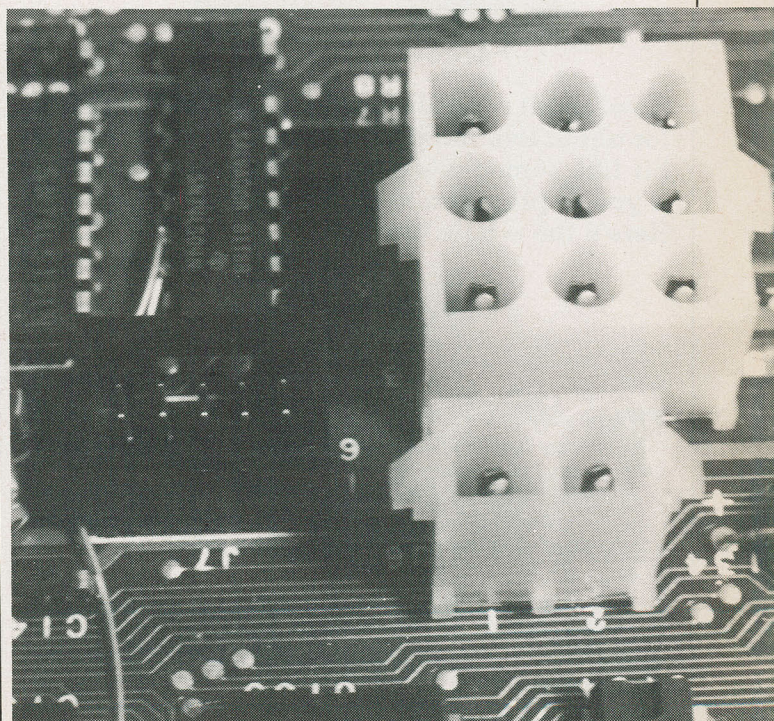
Next, there's the keyboard. You will have to make a cable with a DB 25 connector at one end and whatever your keyboard

wants at the other. Pins one through eight of the DB 25 connector are the keyboard data lines, with one being the least significant. Pin nine is the strobe. For the board to work properly this must be a negative going strobe, that is, this should normally be high, going low when a key is pressed. Pin thirteen carries power from the computer to the keyboard. Pins fourteen through twenty-five are all ground.

Now, we get to the nasty bit, ja... the disk drive connector. The drive end of this is easy... just clamp as many connectors as you need onto an appropriate piece of ribbon cable. If you are going to use five and a quarter inch drives the computer end is easy too. Get a ribbon type DB 37 and clamp it on... the connector pins out perfectly.

If you are going to use eight inch drives... they're cheaper if you can find them... or if you can't get a ribbon type DB 37... I couldn't... you'll have to solder them by hand. Here's the pinout.

1,3	Not connected
2	Size... open for 8's, ground for 5's
4	Index sensor for drive
5	DVSEL1... A: drive select
6	DVSEL2... B: drive select
7	DVSEL3... side of drive select
8	HDL... head load select
9	SPIN... stepping direction
10	SEP... step select
11	WRT... select to write data
12	WRITE... write gate
13	TRK00... track zero sensor
14	WRT PROTECT... write protect notch
15	RAW DATA
16	LOW CURRENT
17	READY... drive ready
18	+12 for drive
19	+5 for drive
20-37	Ground





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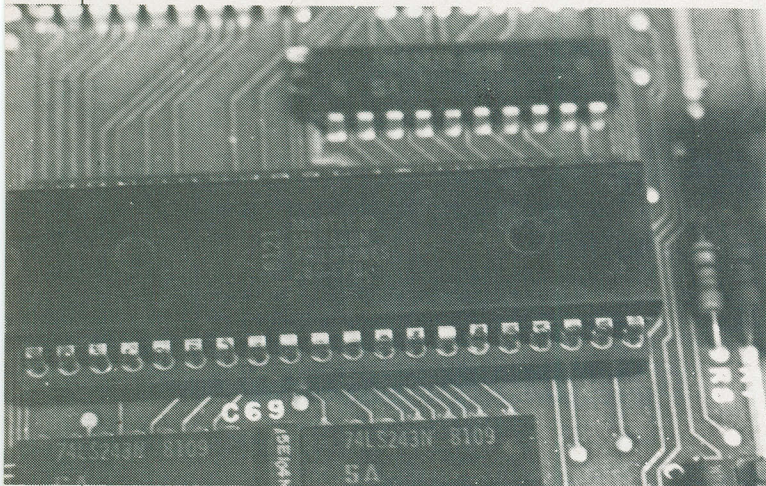
# A Computer for Next to Nothing

## Watch for Smoke

When you've managed to get everything together you'll be able to transcend that most interesting of experiences... plugging it in for the first time. This is nothing to be taken lightly.

One should check everything over one more time... one probably won't, but it's at least worth thinking about for a moment. In the initial tests you should disconnect everything you can until you know that the computer itself is working. You don't need the disk drive or the keyboard for the first bash... just the monitor. When you power the machine the screen should say

...XEROX 820 VER 1.0...  
A-BOOT SYSTEM  
T-TYPEWRITER



At this point the computer itself is working properly. Turn it off. Do whatever you told the gods you were going to do if the thing declined to explode. Connect the keyboard and turn the computer on again.

There is a machine language monitor which comes on line before you boot the computer's operating system. You might want to try it out at this point to see if the keyboard works as it should. Later on you'll probably find it handy for diagnosing hardware hassles if your system fails to boot. Its commands are

**A** Boot from drive A:  
**B** Boot from drive B:  
**Cs,e,d** Copy memory. The line C1000,1100,0100 would move the memory from 1000H to 1100H down to 0100H.  
**D[s,e]** Dump memory. You can specify optional start and stop addresses.  
**Fs,e,c** Fill memory. The line F1000,2000,41 would fill 1000H to 2000H with 41, the letter A.  
**Gs** Run a program at address s.  
**Ip** Input data from port p and show it.  
**Ma** Display contents of address a.  
**Op,d** Send data d to port p.  
**T** Typewriter... largely useless.  
**Vs,e,d** Compare data from address s to e with data starting at d.  
**Xs,d** Test memory from s to d. The value for d should be less than F000 or the system will crash.

If everything seems to be working thus far, power the whole seething mess down again and plug in the disk drive. Reboot the system. Pop the system master into drive A: and type the A command and return. The drive should run and CP/M should appear. You're laughing.



## All Those Wires

The Xerox 820 board... in this state... is certainly a project for the brave and the experienced. However, it's a fascinating undertaking and an astoundingly inexpensive way to get a really first rate computer going.

Max Southall maintains not only a facility to fix up the computers but also a bulletin board which offers... among other things... the source for a suitable BIOS and pots of software to support the board. You won't need it until you get deeply into the works, but it's awfully handy when you do. He himself is a first rate human... a hacker to the core... and the boards he sells are well debugged and working.

The board, a fairly decent assortment of documentation... with all the ports and other stuff I've left out here... and a system master are available for \$179.00 from Micro/Access at Box 137, Station 'V', Toronto, Ontario M6R 3A4 (416) 463-9535 voice or (416) 463-9360 modem.

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The word processor alone is worth the price."  
**WHOLE EARTH SOFTWARE CATALOGUE**

"In our testing we could not make 'Intuit' mis-behave in any manner, despite our best efforts."  
**INFOWORLD**

"Some of the concepts implemented by  
'Intuit' are nothing short of amazing."  
**SOFTWARE NOW!**

"... 'Intuit' is the steal of the year."  
**WHOLE EARTH SOFTWARE REVIEW**

## Applications

Standard applications providing utilities for full volume directory listings, disk formatting, file merging, multi-file printing and others • Future add-on applications include screen and plotter business graphics, communications, spelling checker, table of contents generator

## Integration

With the INTUIT system, everything can be copied to text and between subjects of like type. Almost everything else is copyable from place to place where this does not destroy the original meaning of the information. Information can also be copied between INTUIT and MSDOS® disks, allowing interchange of textual information between other programs and INTUIT.



## Tables (Spreadsheet)

200 rows by 65 columns or 65 rows by 200 columns user selectable and not dependent on memory size • English language command format • Rows, Columns and Cells can be referenced by multi-word names or by numeric coordinates • Named procedures allow user to create customized commands • Thirty verbs including loops and conditionals • Direct entry of numbers into cells with automatic comma formatting for large numbers • Flexible formatting including percent signs, dollar signs, brackets for negative amounts and underlines

## Forms

Free format screen layouts for entry and printing of database records • Flexible report generation and mail merge • Computed numeric fields • Text formatting within forms supports multi-page reports and letters • Sort, find, and selected item printing within forms

## Other Features

Four function memory calculator can be used anywhere • Easy note taking • Full screen explanations at the press of a key • Full screen error messages at user's request

## Hardware

IBM PC® or XT plus most IBM compatibles with at least one floppy disk and 256 KB of RAM memory • INTUIT supports fully configured systems yet runs without limitation on a minimum system • Winchester disk fully supported on the IBM XT • Both monochrome and colour displays supported • A large list of printers can be used • Both serial and parallel ports supported.

Exclusive Canadian Distributor:

**Computron**  
Edmonton • Toronto

If for any reason you are not completely satisfied with INTUIT, return it in good condition within seven days and we will refund your money in full without question (shipping charges excepted).

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We will have a limited number of INTUIT Available at our Toronto offices for pickup orders. Please call first to ensure counter stock is available.

INTUIT is another special product which impressed us at Moorshead Publications so much that we have made special arrangements to supply our readers directly. In mid-1985 it will be available in major stores but until then it is exclusively available from Moorshead Publications.





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